THE RAILWAY GAZETTE
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DIESEL RAILWAY TRACTION SUPPLEMENT

The December issue of THE RAILWAY GAZETTE *Supplement, illustrating and describing developments in Diesel Railway Traction, is now ready, price* 1*s.*

GOODS FOR EXPORT

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export

DISPATCH OF "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE *possesses the necessary permit and machinery for such dispatch, and any reader desirous of arranging for copies to be delivered to an agent or correspondent overseas should place the order with us together with the necessary delivery instructions.*

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas, as they are stopped under the provisions of Statutory Rules & Orders No. 1190 *of* 1940, *and No.* 359 *of* 1941

ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:
Mondays to Fridays 9.30 *a.m. till* 3.45 *p.m.*
The office is closed on Saturdays

Train Reduction and Privilege

IN the House of Commons on November 26 Colonel J. J. Llewellin, Parliamentary Secretary to the Ministry of War Transport, announced that railway passenger services were to be reduced throughout the winter in order that freight traffic essential to the war should have the transport it required. The withdrawal of certain long-distance trains and the reduction of restaurant and sleeping car facilities has since been announced. Colonel Llewellin thus gave practical effect to the forecast made by the Minister of War Transport recently, reported in THE RAILWAY GAZETTE of November 21, that in order to cope with the greatly increased pressure on the railways this winter there was bound to be a further curtailment of passenger services. Further references to this matter are made at pages 593 and 598. There will be few who will cavil at the need to grant priority to essential war goods traffic, but the sting in the tail is to be found in an answer to a Supplementary Question. Colonel Llewellin disclosed that a certain number of sleepers would be reserved for Government officials and for Members of Parliament. In view of the stringent curtailment of general travel facilities which has taken place since the railways passed under Government control, this appears to come suspiciously close to the creation of a privileged class of traveller. There can be little doubt, indeed, that one of the ideas which lurks at the back of the minds of M.P.s and civil servants who toy with the idea of a nationalised railway system, is that they would be able to secure free or privileged travel for themselves. Under private enterprise the railway companies are naturally concerned to provide the best and most efficient services for the greatest number, and serve all without discrimination.

Travel at Christmas

Except for an announcement of the restriction of military and civil service travel over Christmas, and the withdrawal of certain trains and restaurant cars which is to apply throughout the winter, the Government has not made any definite pronouncement on Christmas travel, and has contented itself with the general request to the public that travel should be indulged in as little as possible. We gather, however, that the confusion that prevailed at the Bank Holiday period last August is not likely to recur. Then, although it was stated that extra trains would not be run, the railway companies had to duplicate trains in order to accommodate the large numbers of persons who wished to travel. We understand that on this occasion each company will be left to make its own arrangements, an eminently sound decision. There have been various rumours of the possibility of rationing travel; on the other hand it has been contended that this would involve too large an organisation to be practicable in present circumstances. In our opinion the Government had a simple means at hand to reduce all except urgent passenger travel, simply by making it obligatory on travellers to surrender one or more coupons from their food or clothes ration books in respect of every journey in excess of 50 miles.

Paper Restrictions in Great Britain and Germany

A new paper licensing period began in Great Britain at the end of November, and next week's issue of THE RAILWAY GAZETTE will be the first to be produced under the new arrangements. A lighter weight paper will be adopted, so as to provide as nearly as possible the same number of pages as heretofore. Already some alterations in size of type and arrangement have been effected with the object of preserving our service to our readers, and at the same time making our contribution to the war effort by drastically reducing our paper consumption. Further changes may be necessary in the future, and we feel sure that our readers throughout the world will understand our difficulties in war conditions. Shortage of paper is also being felt increasingly by the German press, as is evidenced by the appearance of copies of German newspapers and trade and technical journals reaching this country. The maximum

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size of advertisements in German papers has now been fixed at 75 mm. by 45 mm. (about 3 in. by 1¾ in.). The large Berlin papers are reduced to six pages and considerable reductions in their circulations have also been enforced. When it is realised that Germany not only produces the raw materials of paper, but also has easy access to Scandinavian supplies, some impression may be gained of the heavy war demands on paper, for munitions and so forth. *Regular support for the paper salvage campaign is a national necessity.*

Railway Dividends and Wages

In *The Railway Review* of November 21, the General Secretary of the National Union of Railwaymen deals at length with a letter from Mr. Ernest Short, General Secretary of the British Railway Stockholders' Union. Mr. Short had taken exception to a previous statement by the N.U.R. leader to the effect that it was open to serious doubt whether a Government guarantee which ensured a return of something like 6 per cent. on ordinary stock was the best method of ensuring maximum efficiency, economy, and good management, and the best relations between management and workers. Mr. Short denied that the guaranteed revenue ensured a return of 6 per cent. and in the main the article in *The Railway Review* is an attempt to show that it does. A table of yields, based on dividends for 1940 and current prices is given, but this, of course, takes no account of the fact that great numbers of railway stockholders have held their securities for many years, that they paid for them far more than current prices, and that in the meantime they have not received even the small returns which now rule. Nor, of course, since there is no yield, does the table refer to nearly £80,000,000 of L.N.E.R. preferred and deferred stock which receives no payment. In contradistinction to the railway stockholder, it is interesting to note that between March, 1939, and November, 1941, the average earnings of railway staff whose salaries or wages do not exceed £500 a year, have risen by not less than 33 per cent.; the rate of pay, exclusive of additions, is up by some 19 per cent. On balance, therefore, there can be no doubt as to whether conditions arising from the war have affected more favourably employee or investor.

Bureaucracy Under Fire

Before the war the increasing stranglehold of bureaucratic government in this country had been sufficiently apparent to occasion alarm. Since September, 1939, however, the progress of the bureaucrats has been so great that there is now no section of industry or the public which does not feel their stifling influence. Lord Perry has put the thoughts of a great many persons into words in a booklet he has recently written.* The author is primarily a man of business, but he has also seen the workings of bureaucracy from within, and does not write merely as an angry industrialist irritated by the interference of Government departments. As we have pointed out in these columns previously, for the peculiar and limited administrative functions for which their service was devised, our Civil Servants have been admirable. It is when they have taken executive powers, for which their training makes them wholly unsuitable, that they fail so completely. The first concern of bureaucrats is to avoid responsibility. Decision and performance teem with dangers which may be avoided by inaction or procrastination. That such men should place themselves in charge of executive duties and undertake trading and industrial functions is a matter of grave concern to those who have the commercial wellbeing of the nation at heart.

Time Wasting Complaints

Those who study Parliamentary proceedings have frequently commented on the number of Questions asked in the House of Commons the answers to which serve no useful purpose, but involve the outlay of considerable time. Restraint could effect a substantial aggregate economy in time and effort which in these days of man-power stringency would be a national boon. One illustration of how pertinacity may fruitlessly squander the time of many comes readily to mind. The railways receive a number of complaints about passenger train departure times, which obviously have to be fixed in relation to other considerations. A passenger may desire that the time of a train should be advanced by 15 min., and writes to the company. He receives a reply, perhaps to the effect that to do so would not suit the majority of passengers, or the working of the line. He may then write the Ministry of War Transport, which passes the matter to the company, which has to reply to the Ministry, which in turn answers the disgruntled passenger, who, if still undaunted, may get his M.P. to ask his Question of the Parliamentary Secretary to the Ministry in the House of Commons. In the aggregate the man-power hours dissipated may be considerable.

Peruvian Corporation Railways

The railways and the connecting steamers on Lake Titicaca brought into the revenue account of the Peruvian Corporation for the year ended June 30, 1941, the sum of £151,841, against £143,161. Gross traffic receipts in currency were higher, but because of the lower average value of the sol, the sterling gross receipts of £798,757 showed a decrease of £14,604. In the working expenses of £646,915 in Peru there was a reduction of £28,285. On the Central Railway of 259 miles on the 4 ft. 8½ in. gauge the net receipts were £69,086, an increase of £15,488. A cash-on-delivery service has been instituted on this railway. Net receipts on the Southern System, which comprises the Southern Railway in Peru (535 miles on the 4 ft. 8½ in. gauge), the Guaqui-La Paz Railway (60 miles metre gauge) in Bolivia, and the lake steamers, amounted to £75,325, a decrease of £6,654, notwithstanding an improvement in the through traffic with Bolivia. The abnormally low level of Lake Titicaca added heavily to steamer expenses, and the devaluation of the Boliviano and the wage additions ordered by the Government without sanction of any compensatory advance in tariffs substantially increased the loss on the Guaqui-La Paz Railway. Sugar and mineral traffic and railcars did well on the Trujillo Railway (60 miles of 3 ft. gauge).

Glasgow's Debt Free Transport

The Glasgow Corporation Transport Committee has been able to pay off all outstanding debts and thus to render the undertaking debt free. The decision to do so involved the transfer of a balance from reserve and other funds amounting to approximately £4,750,000 into the Common Good Fund of the city. Not only does the Common Good Fund benefit by this important money transfer, but the citizens of Glasgow have now become the owners of a transport undertaking, unfettered by debt, the value of which is assessed at something of the order of £10,000,000. The step which has now been taken is a gratifying culmination of many years of sound policy, careful finance, good administration, and efficient operation and organisation. It is the second time in the history of the Glasgow undertaking that it has become debt free. The excellent result which has now been achieved has been the outcome of work of a high order by several general managers whose names have become traditions in the passenger transport industry, and whose efforts have been loyally backed by elected representatives who have served with great distinction on the appropriate corporation committee. The present Convener (Chairman) of the Glasgow Transport Committee is Bailie David S. Brown, who has made a close study of passenger transport. His constant refusal to be deflected from policies of sound finance has contributed a very great deal to the success which has attended the undertaking during the last few years.

Welded Travelling Tunnel Centres

For the lining with concrete of tunnels when rapid construction is important, travelling centres are of great value. In *The Welding Industry* for October there is a description by J. Croston MacKain, the inventor, of travelling centres for tunnels of 35-ft. span and 16 ft. from the floor to the springing line of a parabolic arch which had a rise of 11 ft. 8 in. After trying various riveted schemes, which

* "Beware Bureaucracy," by Lord Perry, price 6d., The Individualist Bookshop Limited, 154, Fleet Street, E.C.4.

were scrapped because of their weight and excessive costs, Mr. MacKain finally decided on a welded design, which proved economical, foolproof for moving to and fixing in each new position, and easy to erect, besides being very rigid. Loading data were given as 1 ft. 9 in. concrete on the arch and side walls, with a probable fall of 9 ft. Concreting was done by beginning simultaneously from the haunches, and working towards the centre. The design is explained in detail in the article, with illustrations. Thirty complete sets of travelling centres were used, and the engineer in charge of the contract reported that he had always been able to move the centres ahead with the greatest of ease. On an average it took a gang of 6 men 14 hours to build one travelling centre complete, including loading up and running in by hand on flat-top bogies an average distance of 75 yd., hoisting to the top of the dumpling, using an air winch, then building on the top of the dumpling complete, and jacking up to the correct level and alignment. When a new length was ready for concrete, it was found that to drop the centre, run it forward, jack it up again, and reset it to correct level and alignment, took a gang of 5 men an average of 2¼ hours. The actual running forward occupied only about 10 minutes.

Signal Backlights

Our recent reference to the peculiar signal backlights on the Finnish railways (October 24 issue, page 425) recalls the fact that coloured backlights were much used in this country at one time. When white front lights were in vogue a small green light was often used as the " on " backlight, white being seen directly the arm moved appreciably from that position. A few signals so fitted still remained at Euston station as lately as three or four years ago. When green became popular as a front light, there was a risk in the use of a green backlight, and blue or violet was adopted by some lines in consequence. The present practice of using a small white light, obscured as soon as the arm moves away from " on," began to command general favour about 50 years ago, and the coloured backlights gradually disappeared. The G.N.R., however, for some years had a violet glass in its backlight spectacles. The visibility of the small violet light was poor, and practically the effect of obscuring the light was obtained by the arrangement. Several Continental countries have, like Finland, used green and red backlights for " on " and " off " in station home signals on single lines, so that the signalling of a train in one direction automatically gave a danger indication for the opposite direction.

Double-Heading Past and Present

Compared with the common practice of, say, thirty years or more ago, the double-heading of trains may be said to have become rare on the main lines of British railways. During the earlier period referred to the weight of many of the trains and the speeds at which they were required to run were increasing and the locomotives then in use were oftentimes outclassed for the principal services. Double-heading had, as a consequence, to be freely resorted to, a usual combination in passenger service being 4-4-0 engines working in pairs with trains of between 400 and 450 tons loading. Nowadays an unassisted modern 4-6-0 or a Pacific can handle much heavier trains than this with comparative ease, and the explanation is not only to be found in the larger proportions and greater power of the engines but also in improved features of design and equipment. Qualified use of the word " improved " is, however, here necessary, for within the limits of their size and capacity very many of the earlier engines were models of correct design, admirably planned to achieve the most excellent results in conjunction with economical working. The use of an assistant engine necessarily entails added cost of working, and, although the practice can hardly be ruled out entirely, it is nowadays mostly restricted to cases wherein engine power which otherwise might be absorbed as a separate light engine return working is put to more profitable use by allocating to it a position in which it is coupled to the train engine of a heavy express.

The Holmes Chapel Accident

THE collision at Holmes Chapel, L.M.S.R., on September 14, 1941, arose from one of those errors in block working formerly often the subject of official inquiry but against which much more provision is now being made than was general years ago. With nothing but the plain block telegraph—not even distant signal proving—and a train register, the accuracy of which may be in doubt, there is often some difficulty in deciding precisely what mistake has been made, and the problem becomes, as in this instance, to balance the probabilities. The principal error is attributed by Colonel Trench, a summary of whose report appears on page 597, to the signalman in rear who, he thinks, failed to give " train entering section " for the first train. The result was, of course, that the block indicator for the section in advance remained irregularly at " line clear," and the train was stopped at the home signal at Holmes Chapel, not having yet been offered forward from there. After accepting the second train, and having, as he declared, received " train out of section " from Holmes Chapel for the first, although he had no recollection of the working of the block needle for it, he did nothing—he was absorbed in a book—until he observed " line clear " was showing for the section in advance, when he concluded that he must have obtained acceptance for the second train but forgotten to pull off his signals. He thereupon did so. The " train entering section " signal which he gave for this train was, the signalman in advance declared, the only one the latter had received, at least for the down line, after accepting the first train, twelve minutes previously, and Colonel Trench holds him somewhat to blame for allowing such a long interval to pass without making enquiries as to the whereabouts of that train, the only one he professed to have any knowledge of. He pulled off his signals just after it had stopped unnoticed at his home signal and the collision occurred soon afterwards, the second train having seen the Holmes Chapel distant at clear. The alternative assumption that the block signals were exchanged for the second train, or even that " train out of section " was given for the first, involves, as Colonel Trench remarks, such a degree of carelessness on the part of the signalman in advance that failure on the part of the man in rear to send " train entering section " for the first train certainly appears to be the real explanation of the case, one presenting interesting features deserving of attention.

Whether " train entering section " was or was not sent for the first train is the principal point in dispute, from which the other consequences derive. On the old L.N.W.R., as on some other lines at the present time, this bell signal was not preceded by " call attention," and was merely acknowledged by placing the block indicator to " train on line," making it comparatively easy to send the bell signal and overlook whether or not the block indicator was duly altered, no audible signal being received in reply. We understand that in more recent years, because of disputes between signalmen as to whether or not " train entering section " had been transmitted, the L.M.S.R. extended to the L.N.W.R. lines the old Midland practice of giving " call attention " and securing an acknowledgment thereto before sending " train entering section."

The Holmes Chapel report leads us to suspect that the signalmen concerned may not have been doing this. The Holmes Chapel signalman said he heard " train entering section " sound while he was underneath the signal box, and that the signal was repeated before he could get to the instrument, whereas all he should have heard given and repeated was " call attention." If the signalman in rear, held to be at fault, did put the first train in section, as he said he did, then in doing so, according to the present rules, it would have been his duty to give " call attention " first and get a reply. Under that procedure, the man in advance would be unlikely to fail to put the needle to " train on line " when the two-beat bell signal followed. We wonder if the men were working in the old L.N.W.R. way, as there is some temptation to do. However that may be, the present method of working lessens the likelihood of the indicator remaining wrongly at " line clear," unless a man forgets to

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do anything at all to signal the train in section; for this reason we should say that, assuming rules were being followed in this respect, there is little doubt that the man in rear was the one at fault.

It may here be observed that in the present standard three-position block working of the Southern Railway the lever of the signal controlling the section in advance is backlocked with the block indicator at "line clear," so that if the latter is not altered from that position, the lever cannot be completely restored, and this forcibly draws attention to the omission. We have heard several signalmen—one commenting on this very accident—say how much they appreciate this feature. By itself, of course, it would not have been effective in this case if the signalman in rear had not replaced any signals behind the first train; but if he did, then it would have called attention to the omission to get the block put to "train on line." In the Southern Railway working this control is naturally combined with that on the section signal and other precautions. The addition of various forms of locking and control to the needle block working, once considered unnecessary by some railways, is being much extended today, but it is the busier and more complicated areas that first get attention. This is the right policy, on the whole, but our experience is that, in proportion, more stupid things are done at the simple block posts where the working is monotonous, and therefore tends to dull the sense of alertness, than at other places. In the old days of manual signalling on the first London tube lines and the Metropolitan Railway, the working was one constant round of the same thing, hour after hour. Everything went right until some small omission was accidentally made, whereby the signalmen would be thrown into confusion, and a serious risk might be taken. The block post in rear of Holmes Chapel was opened only at night and was of the simplest description. The man had been on constant night work of a monotonous kind for over two years and had not had much service with the railway. Colonel Trench thinks it unadvisable that this should be continued, and that probably the man, admittedly reading at the time, had got into the habit of dealing with the bell signals mechanically. He could operate the block instruments, it so happened, sitting down, and might have sent signals without looking at the indicators or putting down his book. It is easy for a man to imagine the working to be so simple that a mistake cannot occur, and he then all the more readily jumps to a wrong conclusion when faced with a condition arising from an unnoticed omission. However, it is only a matter of time before such free working as obtained at the signal boxes involved at Holmes Chapel disappears from our main lines. Beyond stating the facts, the report makes no comment on the interesting fact that no fewer than three of the vehicles of the 16 composing the trains were of all-steel construction, including the last vehicle of the first train, which bore the brunt of the collision. Although it was practically demolished when the overtaking engine ran into it, it may well have saved worse damage to the other vehicles. The equipment of eight of the coaches with special shock-absorbing buffers also probably helped in keeping the casualties to a comparatively low figure, considering the force of the collision.

The Paulista Railway in 1940

ALTHOUGH results were not as good as those obtained in 1939, the annual report of the Paulista Railway Company for 1940 revealed that the year's working was, in general, satisfactory. Receipts totalled 131,098 contos compared with 140,314 in 1939, and expenses were 92,117 contos compared with 89,890. Although the net balance of 38,981 contos was, therefore, nearly 25 per cent. below that of the previous year, the working ratio could still be considered good. The decrease in revenue was a natural consequence of the war which had isolated foreign markets and reduced maritime transport to a minimum and thereby influenced all items of merchandise for export except frozen meat. Coffee tonnage, with the loss of European markets, had fallen off considerably and was alone responsible for a reduction of 6,255 contos in receipts. On the other hand, expenses increased as a result of (1) the higher cost of imported material, and (2) the rise in price of food commodities which had necessitated the granting of increases in salaries and wages. In accordance with contractual privileges, however, the railway company was empowered to raise its rates and fares so that a net return of 8 per cent. on capital might be assured, and in pursuance of these rights a petition was lodged in February last, and approved by the Government in March, whereby it was hoped that the increases in rates and fares proposed would produce a balance in 1941 above the contractual minimum established.

After adding to the balance of 38,981 contos the sum of 14,264 contos brought forward from 1939, the total surplus of 53,245 contos was distributed as follows: 34,965 contos paid in dividends; contribution to Pension Fund, 2,697 contos; interest on external debt, 5,751 contos; Reserve Fund, 2,022 contos; leaving a balance of 7,810 contos to be carried forward to 1941. The principal traffics compared with those in 1939 were as follow:—

	1939	1940
Passengers	6,135,831	6,449,719
Animals	616,163	585,942
Parcels (tons)	103,118	109,438
Coffee (tons)	486,017	406,650
Other goods (tons)	2,739,997	2,786,106
Total traffic moved (ton-km.) ...	740,915,075	711,184,833

The company's foreign debt stood at U.S. $2,513,500 with interest payments up to date, and the fund for amortisation of this debt remained at 111,125 contos. The Improvements and Traffic Expansion Fund was unchanged at 25,200 contos, though the Reserve Fund improved from 13,154 contos to 13,650 contos as a result of interest on investment. In accordance with Decree No. 4,202 of March 10, 1927, a surcharge of 10 per cent. had been made on all tariffs in force to provide for general improvements, and amounts credited to this fund up to December 31, 1940, totalled 137,396 contos. The Forest Services Fund stood at 15,917 contos.

Capital at charge was shown to be 491,842 contos on December 31, 1940; a call had been made for the final instalment of the 1937 share capital issue in March. A new issue of 50,000 contos was made in September and was almost fully subscribed. With the inauguration of the Pompéia-Quintana line 15 km. in length, and the closing of the Anapolis-Visconde do Rio Claro section of the same length, the total route-length of the system was unaltered at 1,511 km. As to new construction and open line works, progress on the Pompéia-Tupan section of the Agudos extension was normal, and permanent way was laid up to Sant' Anna. Gauge widening also proceeded normally between Itirapina and Pederneiras, *via* Jahú, and 12 km. of third rail had already been laid. The new line, 7 km. long, to Capim Fino, was completed. The four electric passenger locomotives received from the General Electric Company towards the end of 1939 were put into service and had given satisfactory results. These powerful locomotives, built for service over the Jundiahy—Rincão route and over the Itirapina—Bauru line, are of the 2-Co + Co2 type and can exert a continuous horsepower of 4,050. They were fully described in our *Electric Railway Traction Supplement* of January 5, 1940 (pages 2 and 3). The electrification of the line from Itirapina to Jahú also proceeded satisfactorily. This is on the 3,000-volt overhead-conductor system, like the existing electrification between Jundiahy and Rincão. Turning to the subject of subsidiary companies, the report states that the Estrada de Ferro Barra Bonita, Estrada de Ferro Morro Agudo, and Estrada de Ferro Jaboticabal were now controlled by the Paulista Railway Company. The two former had shown credit balances of 27 and 11 contos, respectively, but the latter registered a deficit of 13 contos. The Paulista Transport Company showed a net balance of 543 contos.

B.S.S. FOR MASTIC ASPHALT FOR ROOFING.—A British Standard Specification (B.S. 988) has been published, and forms the first of a proposed series. It covers mastic asphalt roofing composed of limestone aggregate and either (*a*) asphaltic bitumen or (*b*) equal proportions of asphaltic bitumen and refined lake asphalt. Provision is made for the proportion of refined lake asphalt up to 50 per cent. of the total asphalt content, to be varied by agreement. Recommendations for the method of laying are included. Copies of the specification may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 2s. 3d. post free.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

The Training of Engineers

Tandem Works, Merton Abbey,
London, S.W.19
November 14

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I was particularly interested in the advice given by Mr. W. A. Stanier to those wishing to become mechanical engineers, in his recent address. I feel that his remarks were particularly well timed, as there is a tendency today to place academic training and distinctions before practical experience, and the impression given by the daily press in their frequent references to the turning out of unskilled men and women as "engineers" after a few months' intensive training does nothing to dispel this idea.

The simple fact is, of course, that academic training and theoretical knowledge will not take the place of practical works training and experience, which are of the first importance to the mechanical engineer. He must not only have a clear understanding of the principles of mechanical design, and of the properties of the materials which he will be called upon to employ, but, in order to design equipment which can be produced in the shops, he must have a practical working knowledge of the tools of his trade, and of workshop practice generally.

Another important point which is sometimes overlooked is that it is only by working in close contact with the men in the shops and having to do their work that he can gain any real understanding of their problems and outlook generally. Years spent in the shops provide a background of experience which cannot be acquired in any other way and which remains a source of strength and inspiration to the mechanical engineer throughout his professional career.

Yours truly,
C. R. PASLEY

Engine "Phlegethon," G.W.R.

58, Tweedsmuir Road,
Glasgow, S.W.2
November 3

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The letter in your October 10 issue of THE RAILWAY GAZETTE has given to me a desire to supply information which I got from my late respected friend Mr. E. L. Ahrons, with whom I frequently exchanged historical information over twenty years ago. In 1885 there were three 2-4-0 engines which stood pilot at Swindon, namely, *Acheron*, *Phlegethon*, and *Hawk*. They came out from Swindon in 1865-66 and were designed by Mr. Joseph Armstrong; twenty were built by the Avonside Engine Works, Bristol, and six by Great Western at Swindon.

Mr. Ahrons stated they were extremely ugly engines. The cylinders were 16 in. × 24 in. and the coupled wheels 6 ft. 6 in. They were the last broad-gauge coupled engines on the Great Western and not convertible. *Phlegethon* had a dent on her chimney when Mr. Ahrons knew her, and a piece out of the top of her chimney also. Mr. Ahrons wrote saying that they did about 1½ miles daily at the time he remembers them as pilots, but in 1886 their placid life was disturbed as they had been rostered to work a regular daily train.

Yours truly,
MALCOLM M. NIVEN

PUBLICATIONS RECEIVED

Workmen's Compensation. Vol. II. The Need for Reform. By Sir Arnold Wilson and Prof. Hermann Levy. London: Oxford University Press. Also New York and Toronto. 9¾ in. × 6½ in. × 1 in. 383 pp. Price 18s. net.—This volume is in four parts. The first, dealing with "the injury," gives some interesting data on fundamental statistics. These cover the main groups of industry in this country, and some international figures are given as well. The authors state that all their investigations into the number and the distribution of accidents according to certain psycho-physical and social distinctions led to the same results, and accidents could no longer be regarded as individual, exceptional, or due to random chance. They recur with depressing regularity as a certain percentage, changing with prosperity and depression periods, variable in different industries or occupations, but only within narrow limits. Legal conceptions are analysed and attention drawn to the admitted deficiencies within the present legal and administrative structure of workmen's compensation. Part II deals with the general scale of compensation, and gives some instructive international comparisons. The precarious conditions of the injured worker and the difficulties of computation of average earnings in cases of short time are examined. Lump sum settlements are dealt with from two angles, the social dangers and the administrative side. A review of weekly payments covers such questions as legal aspects, malingering, medical evidence, light work, one-eyed workers, the role of specialists, remaining infirmities and the view of the I.L.O. Evaluation Report.

In Part III, which discusses the questions of restoration to health and rehabilitation of the injured worker, the British system is compared with international systems. Part IV deals with the administration of workmen's compensation and covers the legal, the medical, and the economic and social sides. On the legal side the authors deal with employers' liability, workmen's compensation, common employment, and administration; and the need for reform on the medical side is stated. On the economic and social sides the authors deal with compulsory insurance and financial security, and suggest the creation of a collective compulsory organisation of employers for accident insurance and the accumulation of a reserve of funds; they analyse the principal systems; suggest that the high cost of workmen's compensation could be reduced by a change in the principle of administration through collective efforts; and discuss the advantages of a system of public administration. "Our aim," they say, "is to set forth a system best suited to our needs and to suggest how it should be administered," and this they do with admirable clearness.

Lessons in Arc Welding. Second edition. Welwyn Garden City, Herts: The Lincoln Electric Co. Ltd. 9 in. × 6 in. 176 pp. Illustrated. Price 3s. 6d. in U.K., 4s. overseas.—This book presents 60 lessons which form the basis of 120 hours' instruction at the Lincoln arc welding school at Cleveland, Ohio. The elementary training in about 10 lessons is given with bare wire electrodes, while all the following instruction deals with the use of the many types of coated or shielded-arc electrodes for fillet and butt welding and surfacing with a variety of parent materials and plate thicknesses, in flat, vertical and overhead position. The instructions are well illustrated by diagrams showing the sequence of operations and the correct oscillating motion of the electrode, and by photographs of completed jobs which should be a stimulus to the student. Series of questions and answers refer to each lesson; this new feature will be useful to students and readers in checking their knowledge. In nomenclature, units and references to U.S.A. codes and regulations this book differs of course from English usage, but the systematic treatment of the subject and its lively presentation should recommend it.

Handbook of Home-Grown Timbers.—A third edition of the "Handbook of Home-Grown Timbers" has just been issued by the Forest Products Research Laboratory of the Department of Scientific and Industrial Research (Teddington, Middlesex). This new edition includes a number of timbers which, generally neglected in peacetime, can be used for various purposes under war conditions. The whole of the text has been revised and contains the results of recent research. Information about fire-resisting properties, as the result of extensive experimental work since the second edition was compiled, is a useful new feature.

Copper, Bronze, and Brass Electric Welding.—Murex Welding Processes Limited, of Waltham Cross, Herts, has issued a leaflet (No. M20) entitled "The Welding of Copper, Bronze and Brass by the Electric Arc Process." This discusses the problem of welding these metals, of which the easiest to treat are the bronzes, although all require care. Particulars are given of the currents required, and there are instructions for using the various Murex electrodes needed for arc welding copper alloys, the successful accomplishment of which depends upon the observation of a few elementary precautions and the exercise of more care in preparation for welding than is usually considered necessary with steel.

XUM

THE SCRAP HEAP

BEWARE OF BUREAUCRATS

Never were there so many who knew so little about so much.—*Lord Perry on bureaucracy.*

* * *

The tax bill of the U.S.A. railways in 1940 was approximately 400 million dollars, the greatest amount on record for any one year.

* * *

RAILWAYMEN AS THIEVES

"The Southern Railway has lost cigarettes and tobacco worth £4,100, spirits, wines, and beer worth £3,100, and clothing worth £3,000 from the Bricklayers Arms goods depot in the last six months," said counsel at Tower Bridge Court one day last week. A porter was fined £5 for theft. A railway clerk, of Hatfield Avenue, Erith, was sentenced to three months and fined £50, with 50 guineas costs. It was stated that he received goods, stolen by other employees and also had parcels in transit re-addressed to himself or to friends. When the lockers of employees at the depot were searched, a large proportion were found to have stolen property in them. When arrested, he had £310 on him in notes, which he said was his money he had saved to buy a plot of land. The magistrate (Mr. Powell) said the case revealed an appalling state of things among the employees at this depot.

* * *

Now that everybody travels by railways, and every part of the country is intersected by them, a printed manual [of information] is one of the most useful books which can be given to the public. Such a little volume has been published by Mr. Bradshaw, of Manchester. . . . It is very small in size, but so full of useful matter that if its bulk were calculated by its intelligence few volumes would be so large.—*From "The Times" of Saturday, October* 16, 1841.

* * *

John A. Roebling sold his first wire rope in 1841 for a canal boat portage over the Allegheny Mountains, and on September 19, 1941, some of the results of this transaction were inspected and others were recalled in a celebration of the 100th birthday of the John A. Roebling's Sons Company in Trenton, New Jersey. That first sale preceded by six years Roebling's Monongahela River suspension bridge at Pittsburgh and the establishment of the present factory in Trenton from which came the wire for such other famous Roebling enterprises as the bridges at Niagara, Brooklyn and Cincinnatti, as well as for the Hudson River crossing at New York and the Golden Gate span at San Francisco.

* * *

We reproduce this week the first of a number of advertisements from *Cook's Excursionist*, dated September 6, 1871, a copy of which was sent to us recently by a correspondent. This number, which is described as 21st series, No. 10, said that twelve numbers would be published during the tourist season, at intervals of about 15 days. *Cook's Excursionist* was established in 1851, and was edited and published by Thomas Cook. The issue before us stated that, as this publication was not accepted by the Post Office authorities as a newspaper, "by an absurd distinction in the new Postal regulations," it was "consequently deprived of the facility of the halfpenny postage rate for Great Britain, and the newspaper postage for the Continent and America." Accordingly, it announced that Thomas Cook had resolved to publish it in Brussels as well as in London, and that copies forwarded to the Continent, as well as to the East, would be posted at Brussels from Cook's Tourist and Excursion Office, 22, Galerie du Roi, Brussels.

SPECIAL THROUGH TICKETS
FROM
LONDON TO TRIESTE.

A Series of Tickets has been established between London and Trieste going *via* Harwich, Rotterdam, Utrecht, Cologne, Mayence, Heidelberg Bâle, Zurich, Coire, over Splugen to Colico, Lake to Como, thence to Milan Venice, and Cormons, with the privilege of stopping at Verona, Padua and every other principal place *en route*. These Tickets are available for going or returning by the St. Gotthard or Splugen, and may be applied by special provision to the Mont Cenis, Simplon, and Brenner routes.

	£	s.	d.
Single Journey from London to Trieste (First Class) . .	10	0	0
Do. do. do. (Second Class) .	7	10	0

Returning from Trieste, by any of the above routes, except the Brenner, for which Return Tickets are not provided.

Parties going by other routes to Brussels, Antwerp, or Malines, will be allowed a reduction of 25s. First Class, and 15s. Second Class, from all the above Fares.

NOTICE APPLYING TO ALL COOK'S COUPONS.

No Coupons must be withdrawn from the Books except by the Ticket Collectors.

No Book of Travelling Coupons from which a leaf is withdrawn can be accepted for repayment; and no repayments for unused Books of Travelling Coupons can be made, except at 98, Fleet Street, London. No Agent is authorised to make any repayments. Entire Books of Travelling Coupons will be repaid for at a reduction of 10 per cent.

There is no reduction for Children above three years of age on Italian Coupons; under three years they are carried Free.

THOS. & JOHN M. COOK, Tourist Offices, London, 98, Fleet Street. Manchester, 43, Piccadilly. Paris, London and New York Hotel, 13, Place du Havre. Cologne, 40, Domhof. Brussels, 22, Galerie du Roi.

All communications respecting Continental Tours and Excursions to be addressed to THOS. COOK, 98, Fleet Street, London.

An advertisement from "Cook's Excursionist," dated September 6, 1871

TURN OUT YOUR WASTE PAPER

One ton of paper can be turned into any of the following:—

1,500	shell containers
9,000	shell fuse components
11,000	mine assemblies
71,000	dust covers for aero engines
36,000	cut-out targets
3,000	boxes for aero-cannon shells

FARES AND HEIGHT

Machines have been provided by the Swiss railways for the use of booking clerks, who are directed to take a measurement of the height of children travelling over their roads. This is rendered necessary by the regulation that all children over 3 ft. tall will be required to pay full fare. Ten years of age is the Swiss limit for half fare, but tall children of tourists, it is declared, never appear to be over ten years of age, so the new expedient was suggested.—*From "The Railway News" of November* 18, 1905.

* * *

An extract from "The Fact Book," which has been kept by the Divisional Engineer, Plymouth, G.W.R., and his predecessors for nearly a century.

Experiments on the increase bulk of a stone by being broken into small pieces

1) A solid block of limestone in Hempstone Cutting measured

	cu. in.
3 ft. 0½ in. × 3 ft. 10 in. × 2 ft. 3 in.	45,333

2) This was then broken into stones of about 40 cu. in. and the stones packed into a rectangular shape. It then measured

	cu. in.
3 ft. 0½in. × 3 ft. × 3 ft. 1 in.	48,618
3 ft. × 3 ft. × 1 ft. 9 in.	27,216
Total	75,834

3) It was then broken into small pieces of about 6 cu. in. and was broken on the ground where it was previously laying. It then measured

	cu. in.
7 ft. 7½ in. × 4 ft. × 1 ft. 6 in. this being filled into one of Holmes's trucks measured in the truck	79,056.
6 ft. 5 in. × 6 ft. 6 in. × 1 ft. 1½ in.	81,081

Crossing the Alleghenies in 1840

This typical view on the old Portage Railroad shows a sectional canal boat being drawn up an inclined plane. It is approaching the headhouse, where stationary engines were located

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

UNITED STATES

Illinois Central Staff Increases

Staff of the Illinois Central Railroad at present totals 36,000 names, an increase of 17 per cent. on the number a year ago.

Goods v. Passengers

Goods traffic on the Illinois Central Railroad accounts for approximately 80 per cent. of the gross revenue, with about 12 per cent. coming from the passenger service, and the rest from mail, express, baggage, incidental services, rents, and interest.

New Streamline Stock for the Pacemaker

The Pacemaker all-coach luxury train running between New York and Chicago by the New York Central route has been entirely re-equipped with streamline coaches. They are of high-tensile low-alloy steel with side skirtings and folding steps. Each coach has 28 rotating and reclining seats with foam rubber cushions, providing seating for 56 passengers.

Level-crossing Fatalities Increase

Accidents at road-rail level crossings in the United States during the first six months of this year resulted in four more fatalities than during the same period of 1940, and 200 more than during the same period of 1939. Some 880 persons lost their lives and 2,213 persons were injured in such accidents during the January-June period of this year. Of the total number of casualties in level-crossing accidents, more than 25 per cent. resulted in death.

PANAMA

Air Traffic

The tremendous expansion occasioned by the U.S.A. defence programme and by commercial activity throughout the American republics has increased air transport activity to such a degree that Pan-American Airways is now operating 17 schedules weekly to South America; 13 of these provide service directly, or by through connection, with the Canal Zone.

Pan American-Grace Airways Inc. inaugurated recently a fourth weekly scheduled service between Cristobal and Buenos Aires. This service provides residents of the Republic of Panama and the Canal Zone with four weekly round trips by Panagra services to Colombia, Ecuador, Peru, Bolivia, Chile, and Argentina.

The new service, which leaves Cristobal on Tuesdays and returns on Fridays, establishes high-speed one-day connection with Lima, stopping only at Cali, Guayaquil, and Talara *en route*. It connects directly through Lima with the newly-established transcontinental service to Rio de Janeiro, which crosses the continent in a direct line through Bolivia.

GERMANY

New Line near Breslau

On the German side of the old Polish frontier, a single-track section from Galbitz to Grosz-Wartenberg was opened on September 15 of a new line designed to extend from Namslau to Neumittelwalde. This section, 14 km. (8½ miles) long, is an extension of the 16-km. (10-mile) section from Buchelsdorf junction, near Namslau, to Galbitz, which was opened in September, 1940. The remaining section, from Grosz-Wartenberg to Neumittelwalde, 28 km. (17 miles), is under construction. Namslau is on the Breslau-Tarnowice-Kattowice main line. Neumittelwalde is on the old frontier, connected by single-track lines with Breslau, and across the border with Ostrow, the important junction of the Poznan-Kattowice and the Ostrow-Warsaw main lines. Construction on the new railway link was begun before the outbreak of war.

FRANCE

Locomotive Works: Increase of Share Capital

The Compagnie Générale de Constructions de Locomotives Batignolles-Châtillon decided at a recent general meeting to increase its share capital from fr. 20,000,000 to fr. 50,000,000.

BULGARIA

The State Railways in 1941

Freight traffic on the State Railways expanded during the first half of 1941 beyond the record figures of 1940, though the number of passengers carried showed a slight decrease, due to wartime curtailment of the passenger train service. Estimated railway traffic and receipts are shown below:—

Item	1940 (full year)	1940 (first half)	1941 (first half)
Traffic			
No. of passengers	13,880,600	6,120,800	6,000,000
No. of carloads	456,300	183,900	260,000
Merchandise in metric tons	6,567,000	2,601,000	3,100,000
Receipts			
Passengers (leva)	558,500,000	245,200,000	260,000,000
Merchandise (leva)	1,395,000,000	553,800,000	870,000,000
Various (leva)	99,400,000	44,900,000	40,000,000

SPAIN

New Locomotives

The first of a batch of general purpose tender locomotives for the National Railways was recently delivered from the works of Maquinista Terrestra y Maritima at Barcelona; they are 10-coupled engines, weighing 102 tons.

Soria-Castejon Line Opened

On October 1, 1941, a new railway was opened from Soria to Castejon, 103 km. (64 m.); it is single track throughout. This is one of the lines on the list of railways under construction summarised on p. 350 of THE RAILWAY GAZETTE of October 10, 1941. The line starts from Soria S. Francisco station, the terminus of the Torralba—Soria branch of the Madrid—Torralba—Zaragoza main line, but also has a newly-constructed connection with Soria station on the Burgos—Calatayud main line of the Santander—Mediterranean railway. Castejon is a junction on the Northern Section Zaragoza—Bilbao main line, and there is a branch from Castejon via Pamplona to Alsasua junction on the main line to Irun, used by through trains from Zaragoza to the French frontier. The new line is thus a closing link in a shorter route from Madrid to Irun, though for the time being is not being used as a through line. It has twelve intermediate stations, Valcorbe, Velilla de la Sierra, Arancon, Aldea de Pozo, Vilar del Campo, Olvega, Agreda, La Nava, Cervera, Fitero, Cintruénigo and Corella; among the construction works are twelve tunnels, three long concrete viaducts, and a large number of smaller bridges.

EIRE

The Emergency Powers Order

The directions given by the Minister for Industry & Commerce regarding the conveyance of traffic over the Great Southern Railways system, to which reference was made at page 551 last week, require that the ordinary services in operation immediately before November 19 for the carriage of passengers, luggage, mails, parcels post, and perishable articles, by passenger train vehicles and road vehicles, shall not be increased without the consent of the Minister. The order, however, allows an auxiliary service for such traffic arising from particular emergency conditions on cross-channel steamer services.

Livestock Traffic

Due to the withdrawal of the restrictions which were enforced owing to the foot and mouth disease, livestock traffic has substantially increased. Cattle which formerly could not be moved in scheduled areas is now available for sale, and the fairs in nearly all cases require an extra supply of vehicles to work the stock forward. When there are 20 to 40 fairs held all over the railway system on the same day, there is considerable difficulty in estimating the actual output of each fair. In every case advice is received beforehand from the stationmasters concerned stating the probable demand, and an increased number of wagons compared with previous years is supplied, but in many cases this is not sufficient. At one fair on November 12, for which the average number of wagons previously required had been about 65, 105 were supplied this year, but actually 140 wagons were required, and vehicles had to be withdrawn from other points to meet the demand. Another fair, however, about the same date, had an output of 70 wagons last year, and arrangements were made to supply a margin over this number to meet this year's requirements, but only 25 loads offered, which, of course, meant that a special train with 45 wagons was not required. The number of cattle wagons available is limited, and there is considerable difficulty in working the traffic, but the reward is reflected in the traffic receipts, which for the week ended November 7 showed an increase of £4,092 on the G.S.R.

Railway for Clonsast Bog

An Emergency Powers Order made by the Minister for Industry & Commerce authorises the Turf Development Board Limited to construct, maintain and operate a railway of 3-ft. gauge approximately 2½ miles in length. The railway may be worked by mechanical or animal power, and used only for the business of that board and the Electricity Supply Board.

THE FAR EAST

Shanghai-Chosen Through Bookings

The Central China Railway is now issuing through tickets and booking goods through from Shanghai to various Korean (Chosen) cities.

XUM

WATER TANK CORROSION

Experimental treatment by electrolysis in U.S.A.

THE corrosive action of water on the interior surface of a tank has been the subject of special research in the U.S.A., and our American contemporary *Railway Engineering & Maintenance* publishes the digest of a report presented to the American Railway Engineering Association, which describes what is known as the cathodic method of dealing with the problem. Underwater corrosion has been proved to result from an electro-chemical process, whereby the metal comprising the tank goes into solution by first forming ferrous hydroxide and, with further oxidation from dissolved oxygen in the water, builds up a wall of iron rust round the pitted area of the surface. The fundamental reactions and factors of corrosion are, in fact, akin to those of a primary electric cell, the shell of the steel tank taking the part of the anode, or positive pole, while the rust represents the cathode, or negative pole.

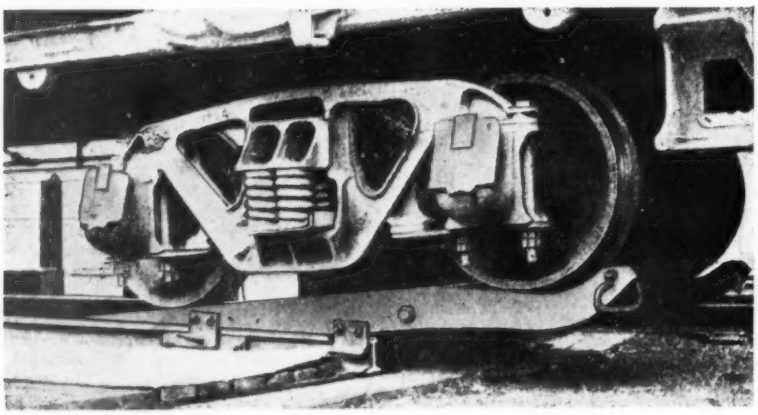
In the application of electrolytic treatment, the steel tank shell becomes the cathode or negative pole, receiving a protective film of hydrogen, deposited by the action of an electric current which flows through the water in one direction from the positive pole, or anode To obtain the necessary direct current, a transformer is introduced into the regular alternating current lighting circuit to reduce the voltage as required, after which a dry-disc rectifier unit changes the power to d.c. From the rectifier, the positive wire is connected to one or more electrodes of carbon, graphite, stainless steel or other metal, which are kept submerged in the water, and the negative wire is connected to the bottom of the tank shell. As soon as the current flows, electrolysis of the water causes hydrogen ions to be attracted to the metal and to form an insulating film below the water line, thus excluding oxygen which is a requisite of corrosion.

Observation of tank interiors treated by this method has shown that the old scale and rust gradually slough off, and the metal becomes coated with a grey deposit, the protection, however, being afforded not by this deposit, but by the microscopic hydrogen film formed during electrolysis.

It is important that, whenever treatment is contemplated of old steel tanks which are badly corroded and pitted, the condition of the plates and rivets should be investigated, as the cathodic protective system may easily set up leakage, when the scale is removed. Similarly, in cold regions there is always the possibility that ice forming in the tops of the tanks may strip the cables and electrodes from their supports.

This method of treating water tanks has the great advantage of obviating the removal from service which is necessary when they are treated by cleansing or by protective coats of paint; another advantage is the fact that the electrolytic treatment is less costly. It is, however, early to decide whether it supplies the complete answer to the corrosion question, although there is evidence from the 25 installations now in service on American railways that some benefits are being obtained.

A Turntable Extension



Left: To avoid the expense of building new turntables, or enlarging existing ones, to meet the demand for turning new locomotives with longer wheelbases, a cradle extension arrangement attached to the permanent way of the turntable has been adopted by the Illinois Central System of the U.S.A., as shown. The bogie of the locomotive is raised above the normal track level on inclined extension members which are curved upward at the ends to provide a stop

THE WORLD'S ROAD MILEAGE.—Some interesting figures relating to the number of motor vehicles in service in all the different countries of the world were given in the Road Transport Section of THE RAILWAY GAZETTE of April 18, 1941, at page 445. From another source, namely, the *Industrial Reference Service* of the U.S.A. Department of Commerce, we now reproduce, as complementary to the figures referred to, a summary showing the road mileage of each continent, in relation to the road mileage and number of motor vehicles :—

Continent	Area (sq. miles)	Road mileage	Area per mile of road	Motor vehicles	Vehicles per mile of road
America	15,768 746	4,243,470	3·8	33,350,828	8·5
Europe	10,299,505	3,576,004	3·0	9,534,690	2·7
Africa	11,063,833	466,761	23·7	675,421	1·4
Asia	10,191,395	1,214,351	8·4	712,542	0·6
Australia, New Zealand, and Oceania	3,241,701	583,731	5·8	1,186,076	2·1
Total	50,565,180	10,084,317	5·0	45,459,557	4·5

A NEW SOUTH AMERICAN INTERNATIONAL RAILWAY.—In our issue of October 31 last our Argentine correspondent's letter at page 436 announced the sanction of the Federal Government to the resumption of work on the Salta—Socompa international railway and allotment of funds for that purpose. The projected line will run from Rosario de Lerma in the Province of Salta across the Cordillera Real and Los Andes to Socompa on the Los Andes and Chilean border, and is likely at some future date to be extended to Antofagasta. The line now under construction is not expected to prove immediately remunerative of itself. It should, however, develop the whole area and encourage the settlement of stock farmers there by linking their farms with northern Chilean markets and with Pacific ports. From the administrative viewpoint the new line has much to recommend it and, in addition, it will serve as a valuable international link between the countries directly and indirectly concerned.

THE EVOLUTION OF THE AMERICAN RAIL

A review of the development of the railway rail in America, including the change from iron to steel, the evolution of the modern American flat-bottom section, up to 152 lb. per yd. in weight, and present-day American rolling methods

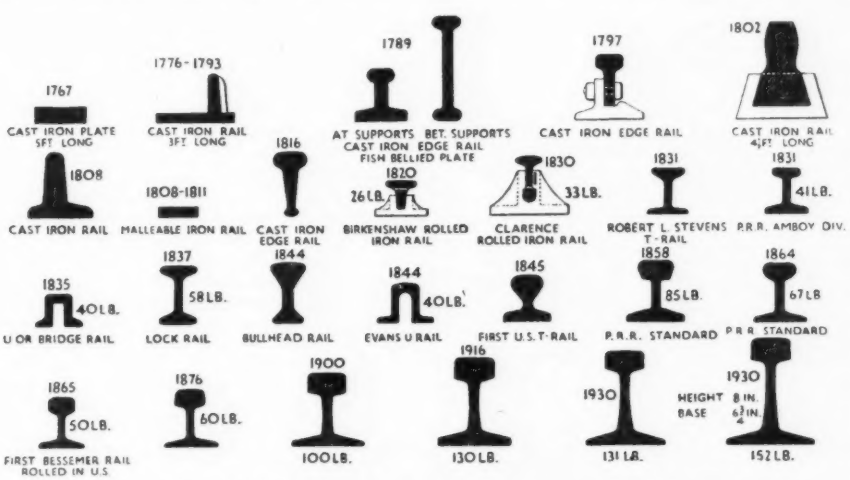
By CECIL J. ALLEN, M.Inst.T.

AN American anniversary of note, which fell in 1940, was made the subject of a series of interesting articles in the September, 1940, issue of *Railway Engineering and Maintenance*. The anniversary commemorated the rolling, on May 24, 1865—75 years previously—of the first steel rails in North America, an event which took place at Captain E. B. Ward's Chicago Rolling Mill, one of the predecessors of the United States Steel Corporation. In a historical review, which stresses the significance of the rail in transportation, four major events are cited as having together made the rail the foundation on which modern railway progress has been evolved. These were, first, the invention of the wheel, before the dawn of recorded history; second, the introduction of the wheel with a single flange, riding on a flat-topped edge rail; third, the production by Birkinshaw in 1820 of the first rails by rolling instead of casting, so for the first time making mass production possible; and, fourth, the rolling of the first steel rails in 1865. The review in *Railway Engineering and Maintenance* begins by tracing the early history of the rail in England, but there is no need to recapitulate this part of the history, which is fully dealt with in the handbook "The Evolution of Railways," by Charles E. Lee.

In America the earliest railways followed the older English practice of using longitudinal timbers, in conjunction with flanged wheels, and with the bearing surface of the timbers protected by iron straps—a form of construction that persisted until 1847, owing to the high cost of iron rails, which had to be obtained from England. In 1830, Robert L. Stevens, President & Chief Engineer of the Camden & Amboy Railroad & Transportation Company, come to England in order to purchase a locomotive for his line, and occupied his time on a lengthy voyage by sailing ship in designing a new type of rail, with which the use of cast-iron chairs would be unnecessary, ironworkers being scarce in the United States. In this design, therefore, he combined a T-head with a flat foot, and endeavoured to contract for a rolling of rails of this section in Great Britain. At first no British manufacturers would entertain the proposal, owing to the damage which they imagined the rolling of such a section might do to their mills, but eventually the Dowlais Ironworks undertook the contract. There actually were several breakdowns, and the rails left the rolls severely twisted and bent, until a new method of hot straightening was devised to overcome the latter difficulty. Finally 550 Dowlais wrought-iron rails of the Stevens section reached Philadelphia in May, 1831. They were 16 ft. long and $3\frac{1}{2}$ in. high; the head was $2\frac{1}{8}$ in. wide and the foot $3\frac{1}{2}$ in.; and the weight was 36 lb. per yd., later increased to $39\frac{1}{3}$ lb. and then to 42 lb. The original idea of Stevens was to have the foot of his rails wider at the sleepers than elsewhere, in order to obtain a better bearing, but these flange widenings at 2 ft. intervals were found impracticable as a rolling proposition, and a foot with edges parallel throughout was rolled.

Rail Sections

Thus from the early days of American railroads a flat-bottom rail section was in use, though it was not at first popular, as these rails had to be imported from England, with heavy freight charges added to their first cost. Between 1835 and 1845 the inverted U or bridge rail had some vogue in the United States, and was the first rail section actually rolled in that country, at the Mount Savage Iron Works, Frostburg, Maryland, in 1844. The first flat-bottom rails were rolled in October of the following year at the Montour Rolling Mill, Danville, Pennsylvania, which was the first American mill laid down specially for the manufacture of rails. During the next few years many more rail rolling plants were built, to meet the enormous demand for rails arising out of the rapid expansion of American railway mileage. By the end of 1848 this had reached a total of 6,261 miles in the United States, and from then until 1862 the annual increase was anything from 1,000 to nearly 3,500 miles. But this rapid growth of mileage had an adverse effect on the growth of rail sections, for engineers were under compulsion to lay the maximum mileage of track for any given expenditure, and economy in rail was essential. Thus even as late as 1865 the majority of American rails weighed only from 40 to 45 lb. per yd., and few rails exceeded 50 lb. per yd. Latterly, however, the heavy axle-loads of American rolling stock—and particularly of locomotive axles, which frequently carry 30 tons and upwards per axle—have compelled drastic increases in the weight of American rails. In the last two decades, the average weight per yd. of rail laid in the main tracks of all Class 1 railways in the United States has increased from 82·2 lb. in 1920 to 86·0 lb. in 1925, 90·8 lb. in 1930, 92·7 lb. in 1935, and 94·2 lb. in 1938, the last year for which complete figures are available. The increase was thus more rapid from 1920 to 1930, but the subsequent years of financial depression, in which rail replacement was reduced to a minimum, slowed it down considerably between 1930 and 1938. Nevertheless, many miles



Sections in chronological order showing the development of the American rail

of first class track carrying fast and heavy traffic are now laid with the 112 lb. and 131 lb. per yd. sections of the American Railway Engineering Association, first introduced in 1933, and by the Pennsylvania Railroad with its even heavier 152 lb. section. The former was designed to carry axle-loads up to 80,000 lb. (35·7 tons) at speeds up to 80 m.p.h., and the 152 lb. rail axle-loads up to 100,000 lb. (44·6 tons) at speeds up to 100 m.p.h., so that both are well ahead of present requirements so far as concerns strength.

The review of rail development in *Railway Engineering and Maintenance* traces the evolution of profile in the modern American rail sections, and is critical of the failure of one standards committee after another to appreciate the fact that increased stiffness of the rail, particularly in the vertical plane, was necessary for the proper distribution of increasing loads. This failure "created a problem with respect to rail breakage that became a curse to railway operation and maintenance that persisted for more than three decades." The early American rail sections were low, with thick bases and narrow heads. In 1874 a committee of eminent engineers was called to consider the standardisation of sections, and all that it could suggest was to transfer some metal from the foot of the rail to the head, thereby increasing its height by ¼-in. or so, and giving a section which could safely wear down a little further before requiring replacement, but adding practically nothing to its resistance to bending. As a result these new sections aggravated rather than relieved the breakage problem; lack of stiffness increased the difficulties of maintaining line and surface; and the thin base of the rails concentrated wheel loads on individual sleepers (this being before the era of the interposed soleplate), and destroyed a vast number of sleepers before they had completed a normal life. The heavier sections were afflicted with the same disabilities as the lighter, and the situation became so serious that in 1887 the Roadmasters' Association requested the American Society of Civil Engineers to investigate the whole subject of rail design. The request was turned over to a committee which two years earlier had begun a study of the relation between the rail-head and the car wheel, and which was enlarged for the purpose of the new investigation.

The Dudley 80-lb. Rail

Seven years earlier, in 1883, Dr. P. H. Dudley, Consulting Engineer of the New York Central & Hudson River RR., had come to a realisation of the chief cause of rail failure, and had designed an 80 lb. rail section which differed radically from the profiles then current by having a deeper web and thicker flanges, but proportionately less metal in the head; in service this showed a marked superiority to the sections it replaced. But the A.S.C.E. ignored Dr. Dudley's work, and its new sections, ranging in weight from 40 to 100 lb. per yd., perpetuated the old evils. Nevertheless the new standards were hailed as the complete solution of the problem, and as most of the railways started to buy heavier rails after their introduction, it was not until about 1900 that the breakage trouble once again began to assert itself; also the reduction from many individual railway sections to a relatively few standard sections naturally made for economies in production. By 1906 the problem was once again acute, and the American Railway Association appointed a fresh committee to study the whole question of rail design. Its report, made in October, 1907, compromised between the ideas of Dr. Dudley and current practice by having two sets of sections, ranging from 60 to 100 lb., the "A" sections being a modification of the Dudley rail, and the "B" sections a modification of the A.S.C.E. standards, but again the designs were faulty in several respects, and lacked both the needed stiffness and adequate wearing capacity. The American Railway Engineering Association next took over the question of rail design, and in 1915, after seven years of intensive study, adopted two sections weighing 110 and 120 lb. per yd., following these up in 1920 by 130 and 140 lb. sections. The principle was still that of compromise between the high rail with shallow head, and the deep head with inadequate vertical stiffness in the section as a whole, and the results were again not entirely satisfactory.

Finally the A.R.E.A. rail committee tackled the matter still more intensively, concentrating attention on the 110 lb. and 130 lb. sections. It came to the conclusion that more economical distribution of the metal was possible, in order to give both additional stiffness and more reserve of metal in the head to compensate for loss by abrasion. Maximum stiffness was sought in both the vertical and horizontal planes, proportionately to the amount of metal available in the section; width of base was proportioned to height to ensure stability against overturning; and endeavours were made to distribute the metal between head, web, and foot in such a way as to minimise internal strains in the sections while cooling, as a safeguard against shatter-cracking. The result was the evolution in 1933 of the A.R.E.A. 112 lb. and 131 lb. standard sections, the scientific design of which has done more to solve the American rail section problem than any previous attempt. As a result, practically all rails rolled in the U.S.A. since 1933 of a greater weight than 100 lb. per yd. (except the Pennsylvania 152 lb. per yd. section, which has also been used on the Bessemer & Lake Erie) have been of the A.R.E.A. 112 lb. and 131 lb. sections.

The Economy of Heavy Rails

Recently a report was presented to the annual Convention in Chicago of the Roadmasters and Maintenance of Way Association by a committee which has been investigating the effect of increasing rail weight on track maintenance. A representative of the Louisville & Nashville RR. submitted figures showing that on a stretch of line carrying approximately 25,000,000 gross tons of traffic annually, 52 per cent. straight and 48 per cent. curved, by the substitution of 131 lb. rail for 100 lb. rail the life of rails was increased from 14 to 18 years on straight track, and from 8 to 10 years on curved track, the life of creosoted sleepers from 16 to 24 years on straight track and 12 to 20 years on curved track, and the life of fishplates, as a general average, from 20 to 30 years. Exclusive of labour, the cost of laying one track mile increased from $9,837 to $13,226, but by reason of increased life the net saving effected per mile per annum had been $126. As to upkeep of track, the Erie RR. had under observation from 1929 to 1938 a length of 20·4 miles of line between Port Jervis, N.Y., and Lackawaxen, Pa., which during this period had its rails gradually changed from the 100 lb. to the 130 lb. and 131 lb. sections. The annual traffic carried over the line, mostly coal, was 25,281,000 gross tons in 1929, but had dropped to 16,440,000 tons by 1938. In the same period, however, the man-hours required for maintenance fell in a considerably greater ratio from 87,270 to 52,450 per annum. This particular route is 73 per cent. curved, 31 per cent. of the curves being of 17½ ch. radius or sharper, and the complete installation of curve lubricators during this period was in part responsible for reduced maintenance; further, it helped in reducing the rail renewals by 50 per cent. in the 1934-1938 period as compared with that from 1929 to 1933. Similarly sleeper renewals decreased from 205 to 80 per mile in the second period, as compared with the first.

Another American railroad calculated that on a district annually carrying an average of 23,000,000 gross tons of traffic per mile, where 100 lb. rail had an average life of 5½ years, the 130 lb. section would require to remain in service for 8½ years to justify its increased capital cost; actually it has been found that the minimum with the 130 lb. section will be 10 years, and the average considerably more. An exceptional case was quoted of some 14½-ch. radius curves on a busy route on which 110 lb. rail had to be renewed in less than 2 years, whereas 130 lb. rail has been laid in for 10 years without requiring renewal. It is contended that the greater stiffness and solidity of the heavier sections materially helps in the reduction of maintenance costs, though the extent of this contribution has long been a matter of controversy, and closer sleeper spacing together with better drainage and ballasting are generally considered to be of much more importance than rail stiffness alone.

In the matter of length of rail, progress in America was not merely slow in the earliest days, but has remained so. The first cast-iron rails were 3 ft. long, and the introduction of malleable-iron rails increased the length to 6 ft. When rolled rails came in, the length grew to 15 ft., and by 1855 the first 30 ft. rails had been rolled in America. But it was many years before any general demand for 30 ft. rails was experienced, and it was 44 years before any increase was

made in the standard American rail length, and that was merely to 33 ft. in 1899. About the year 1925 a further increase took place in the length to 39 ft., which has remained the standard ever since, apart from the rolling of a few experimental 78 ft. rails at certain mills, and the production of longer lengths, ranging in some cases from 5,280 to 6,900 ft. continuously, by welding. The restricting influences on rail length in the United States have been mill layouts and the capacity of the gondola cars used for rail transport; in this matter American railways are far behind the European length standards, ranging from the 60 ft. and 90 ft. of Great Britain to the 30 m. (98 ft. 5 in.) of Germany.

The Introduction of Steel

It was nine years after the first steel rails had been rolled, in 1856, that the first rolling in steel took place in the United States. In 1855 Bessemer had invented his process of making steel by blowing air in a converter through a mass of molten pig iron, and rails were manufactured in England from this material in the year following, but the brittleness of the first steel made it so unreliable that makers were opposed to the new process, and refused at first to accept Mushet's discovery in 1856 that the solution of the brittleness problem lay in introducing the healing and toughening effect of manganese into the steel, by adding spiegeleisen or ferro-manganese to the bath. Their opposition was such that Bessemer had to build his own steel plant at Sheffield in 1860, in which steel rails were rolled; in 1863 some of these rails were imported into the United States. On May 24, 1865, however, the first steel rails, six in number, were rolled in the U.S.A., and it was 1867 before the first commercial order for steel rails was executed. As in Great Britain, so for many years in North America the chemical composition and methods of manufacture of rails were left to the makers, and it was not until the years 1875 to 1880 that any attempt was made to control carbon, limits of 0·30 to 0·50 per cent. being fixed by some railways; later on phosphorus and silicon percentages were fixed. Meantime various railways had begun to lay down elaborate provisions in regard to testing and inspection, and as a result of the publication by the technical societies of various papers and discussions on rail chemistry and manufacture, many railway engineers began to prepare their own specifications, with the result that, as with the rail sections, the situation became chaotic. Variations in hardness and wearing quality were causing such concern that in 1892 the Roadmasters' Association presented a report recommending that the carbon limits be 0·25 to 0·60 per cent., and that manganese, not previously specified, should be 0·60 to 1·60 per cent., the proportions of sulphur, phosphorus, and silicon being left to the discretion of the makers.

The committees responsible for investigating rail design, as mentioned in the previous paragraphs, did not regard composition and manufacture as lying within their terms of reference, and it was not until April, 1908, that the American Railway Association, with the co-operation of the manufacturers and recognised steel experts, produced the first standard specification in which chemical compositions for both Bessemer and open-hearth rails were specified. The problem had become urgent, as Bessemer steel rails, up till then in general use, had with their relatively low carbon content shown inability to stand up to the increasing severity of traffic conditions, particularly as regards abrasive wear and flow of metal in the heads, while breakages were increasing on an alarming scale. The change-over from Bessemer to open-hearth steel began with the rolling of the first open-hearth rails in 1902 at the Ensley works in Alabama of the Tennessee Coal, Iron & Railroad Company, and continued until by 1913 rail production had become 100 per cent. open-hearth. This change, with the rigorous limitation of sulphur and phosphorus that it made possible, however, tempted the standards committee of the American Railway Engineering Association, to whom the matter of composition had now been turned over, to specify very high carbon percentages, in the pursuit of greater hardness. The result was to produce a fresh menace in the shape of shatter-cracking of the rail-heads, with the subsequent development of transverse fissures, and a new and alarming crop of rail failures. These first came under notice in 1911, and as they increased in numbers contention arose between the railways and the makers as to whether they were the result of improper manufacturing processes or to excessive axle-loads and inadequate maintenance. Investigation of the failures, beyond showing that certain heats of steel produced more transverse fissures than others, did not reach any solution of this new problem, and it was twenty years before the University of Illinois set out to enquire into the matter. Simultaneously independent investigations were conducted by the steel companies, and as a result of these and the Sandberg researches in England the principle of controlled cooling, which has now become standard in both North America and Great Britain, and has been the subject of frequent references in THE RAILWAY GAZETTE, was introduced. Also of American origin is the process of Brunorizing, which is more elaborate and costly; this is both a protection against fissuring, and increases the toughness of the steel and its resistance to shock at low temperatures, especially when applied in conjunction with the high combinations of carbon and manganese common in America. At the Gary, Indiana, works of the Carnegie-Illinois Steel Corporation, which developed this treatment, it is conducted in a furnace fired with coke oven gas, 252 ft. long and 9½ ft. wide inside, capable of holding 54 39 ft. rails in six groups of nine each. The treatment takes from 18 to 30 min., but prior to this all the rails treated have spent at least 2 hr. in holding furnaces at a temperature of between 425° and 540° C.

American Rail Steel Composition

It may be added here that the standard composition to which American rail steel casts are made is as follows:—

Weight of rail per yd. ...	50–69 lb.	70–84 lb.	85–100 lb.	101–120 lb.	121–140 lb.
	per cent.	per cent.	per cent.	per cent.	per cent.
Carbon ...	0·50–0·63	0·53–0·70	0·64–0·77	0·67–0·80	0·69–0·82
Manganese ...	0·60–0·90	0·60–0·90	0·60–0·90	0·70–1·00	0·70–1·00
Silicon	0·10–0·23	0·10–0·23	0·10–0·23	0·10–0·23	0·10–0·23
Phosphorus ...	Max. 0·04	Max. 0·04	Max. 0·04	Max. 0·04	Max. 0·04

It is probably on account of these extremely high carbon percentages that the heat treatment of rails has never made any headway in the United States. An article reviewing rail developments in the U.S.A. in the July issue of *Metal Progress*, indeed, stated categorically that "attempts at heat treating, including many extensive trials, have not resulted in a heat treated rail that fills the service and safety requirements. . . . No practical method has yet been secured for heat treating such sections on a commercial basis and in a manner that will ensure the resulting and wear resistance desired, and the safety that is essential." This is in singular contrast to the popularity of the Sandberg sorbitic heat treatment for rails in Great Britain, but in the ordinary course the latter has to deal only with medium manganese steels containing not more than 0·60 per cent. carbon, or low manganese steels with up to 0·55 per cent. carbon, as compared with these American rail steels with up to and exceeding 0·80 per cent.—a very different proposition from the safety point of view. On the other hand, a good deal has been done in the United States in applying a modified heat treatment to the extreme ends of the rails, in order to counteract the tendency of the rail to batter on the running surface at the joints, and practical and safe methods have been developed for this purpose at the rail-mills. The treatment is also applied *in situ* to rails in the track when necessary. With these developments in section and composition, added to the improvements that have been effected in steel production and rolling mill methods, it is now claimed that the American rail has caught up to modern traffic conditions in that country.

In conclusion, a brief reference to present-day rolling mill methods in the United States may be of interest. Rail consumption in North America, together with the demands of the export trade, is on such a scale that a number of mills devote their output mainly to rails, and produce on a very large scale. In order to obtain this output, instead of the three stands of rolls customary in this country—blooming, roughing, and finishing—with the bloom moving backwards and forwards until it has completed fifteen to twenty passes

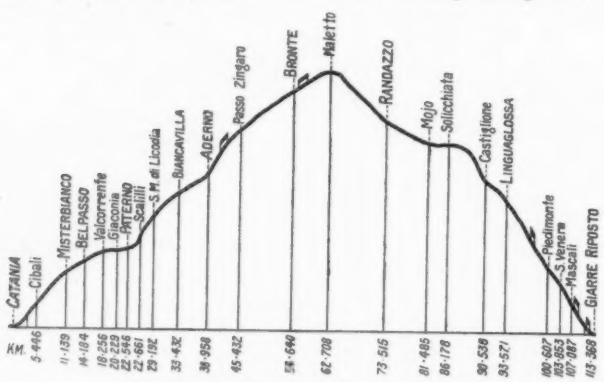
XUM

through the blooming mill, and a total of eight or nine through the roughing and finishing—in the larger American mills something in the nature of continuous rolling is practised, the number of roll stands being increased accordingly. For example, at the Gary, Indiana, works of the Carnegie-Illinois Steel Corporation, the rail-mill occupies a building one-third of a mile in length. Five separate stands of rolls are used for the blooming, reducing the 23 in. square ingot to a cross-section 8 in. square, after which the crop is taken off, and the bloom is divided into two halves for convenience in rolling. After these is a three-high blooming mill, No. 5, through which five passes are given, with a double reverse of the bloom. No. 6 stand forms the roughing mill, and is also three-high, giving the bloom three passes, after which it is delivered to No. 7, a two-high stand in which the first impression of the section is rolled into it. The next pass is through the No. 8, or flanging stand; from this the piece is moved by transfer table to Nos. 9 and 10 stands, which are for edging purposes. The final stands—Nos. 11 and 12—put the finishing touches on the section; No. 11, the leader stand, has a vertical head roll, and No. 12, the finisher stand, a vertical base roll. This remarkable mill is one-third of a mile in length, and with its twelve sets of rolls can receive ingots from the soaking pits at the rate of one per minute. Each ingot travels roughly two-fifths of a mile (including reversals of direction) from the ingot transfer car until it emerges on the cooling-bank as finished rails, the complete operation of rolling taking just under 7 min. It enters the first blooming stand at a speed of 49 ft. per min., and leaves the finishing stand at 645 ft. per min.; the commencing temperature is about 1,150° C., and the finishing temperature 1,000° C. The rail ingots, as previously mentioned, are 23 in. square, and range in height up to a maximum of 7 ft. 6 in., according to the section to be rolled, and in weight up to 11,100 lb., or about 5 tons. If 112 lb. rails are being rolled, an ingot of this size produces two 119 ft. lengths of rail, sufficient to cut six 39 ft. lengths; the maximum capacity of the mill, at 60 ingots per hr., is thus 360 finished rails 39 ft. long, or 234 tons, neglecting the "crop," or discarded steel from the top of each ingot. Equipment is provided at Gary for controlled cooling, end hardening, and Brunorizing. A total staff of 860 is employed in the Gary rail-mill, which provides a notable example of modern American rail production methods.

THE CIRCUM-ETNA RAILWAY, SICILY

A steeply-graded line serving the town of Catania, which now has an important German-occupied aerodrome

BEFORE the outbreak of the present war, the island of Sicily was one of the less known parts of Europe to the great majority of travellers, but its use by the enemy for important air bases has recently brought it into considerable prominence. Thus, the town of Catania has come to be familiar to readers of the daily war bulletins as a frequent target for R.A.F. bombing attacks, by reason of the large German-occupied aerodrome there. It is less well known, however, that Catania is the terminus of one of the most interesting little railways in Italy, namely the Circum-Etna Railway. As will be seen from the accompanying sketch map, the line runs right round the base of the famous volcanic mountain, and the location and construction of the railway through extensive lava fields was an extremely difficult and arduous task. This narrow-gauge railway was built by Robert Trewhella, an English engineer,



Gradient profile and distance table

in the late '80s and was opened to public traffic in 1892, when the undertaking was turned over to an Italian company. The line begins at the port of Catania and passes through the villages of Paterno, Aderno, Bronte, and Randazzo; the last-named is on the northern slopes of Mount Etna. The line descends by Linguaglossa and Piedimonte, until it reaches the coast town of Giarre Riposto, the principal commercial town of Sicily.

The total length of the line is 113 km. (70 miles) and the maximum altitude, which is attained at Maletto is between 900 and 1,000 metres (say 2,950 to 3,280 ft.) above sea level.

Sketch map of Circum-Etna Railway

The railway makes a complete circuit of Mount Etna (13,000 ft. high), passing over and through many old lava fields. The principal cultivation on the slopes of Etna and the lower valleys includes the Paterno blood oranges, the pistachio, filbert nuts, olives, and grain. The railway brings the agricultural products of the district down to the seaport of Catania on the south, and to Giarre Riposto on the north-eastern side of the mountain, not far from Aci Reale. The town of Catania has been destroyed several times during great eruptions, but has been rebuilt by its inhabitants on the same site. Some illustrations of the railway were included in THE RAILWAY GAZETTE of January 21, 1927.

According to the latest available information, the line is owned by the Soc. Siciliana di Lavori Pubblici; it is known as the Ferrovia Circumetnea. The gauge is 0.95 m. (3 ft. 1⅜ in.), and the rolling stock consists of 14 locomotives, 36 carriages, 238 wagons, and 6 railcars.

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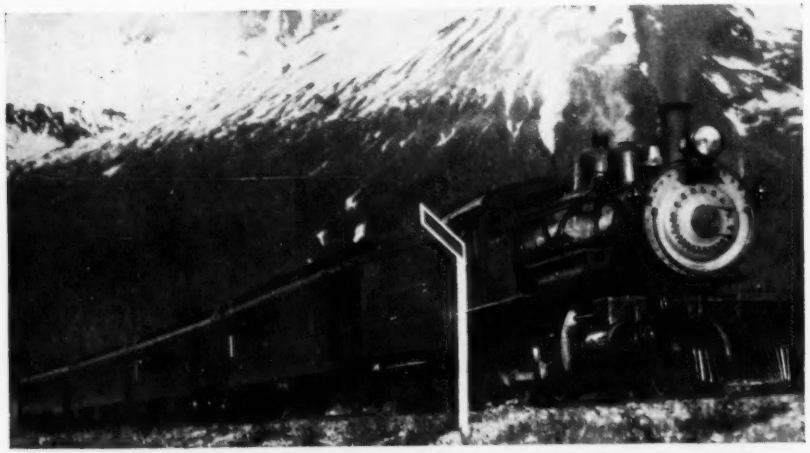
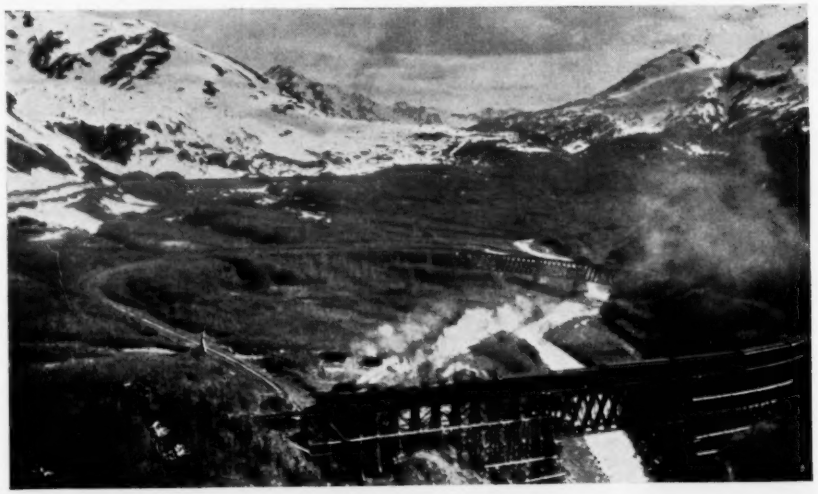
The Railways of Alaska

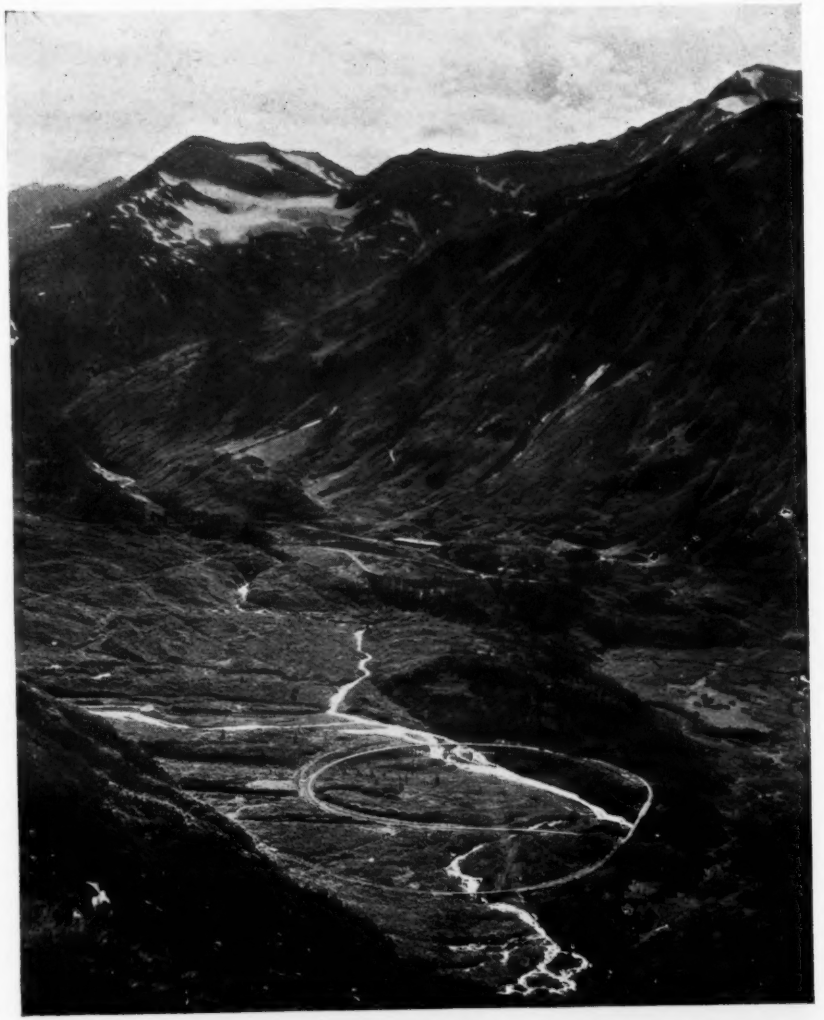
(See article in our October 24 issue, page 408)



Passenger train on the Alaska Railroad



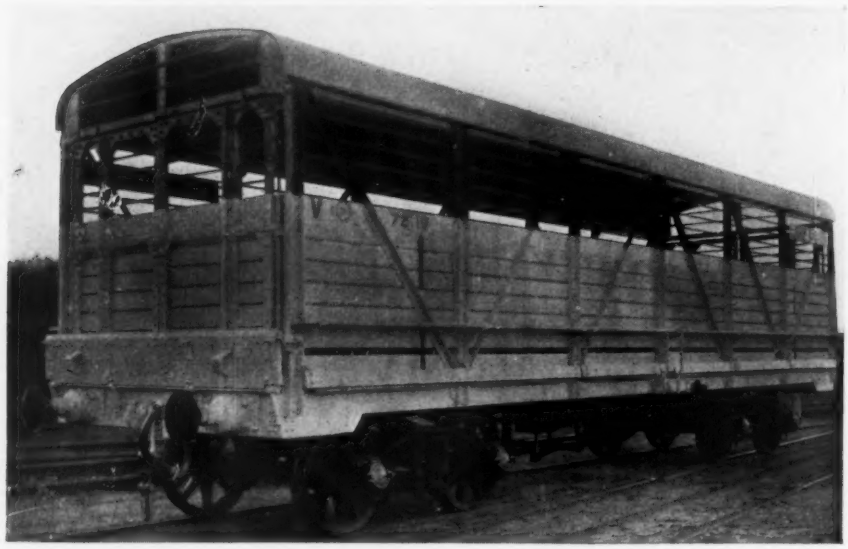
Upper part of the loop, Alaska Railroad



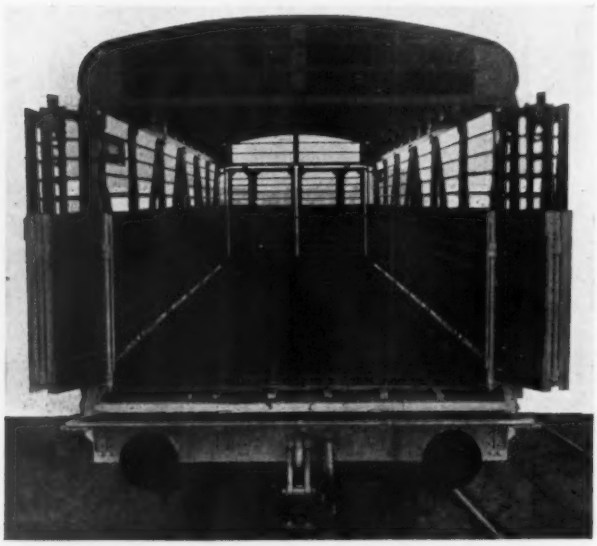
Loop district in the Chugach Mountains, Alaska Railroad

NEW STANDARD BROAD-GAUGE CATTLE WAGON, BUENOS AYRES & PACIFIC RAILWAY

First step towards the standardisation of rolling stock in Argentina



THE Buenos Ayres & Pacific Railway Company has recently put into service a new standard type of cattle wagon. The design of these wagons is the first step towards the standardisation of rolling stock on the Argentine railways, and is the outcome of considerable study and investigations by a joint committee composed of the chief mechanical engineers and traffic managers of the different broad-gauge railways, working in collaboration with the *Instituto Argentino de Racionalización de Materiales* (*I.R.A.M.*), formed some five years ago to standardise materials and specifications. The scope of the activities of this organisation were briefly outlined in THE RAILWAY GAZETTE of March 7, 1941.



Interior view of the wagon, showing arrangement of sides to assure perfect ventilation

In view of the importance of the livestock traffic over their lines, the British-owned Argentine railways are fully alive to the desirability of providing ample and up-to-date, and at the same time elastic, facilities for handling it cheaply and expeditiously. The aim of the committee was, therefore, to evolve a standard type of wagon adapted for use on any of the four broad-gauge lines, the general adoption of which would contribute to greater operating efficiency and economy in the loading and unloading of livestock.

These wagons have been constructed in the B.A.P.R. workshops at Junin, with the exception of the stainless steel frames, which were imported from Europe. The number so far constructed and put into service is 30, but eventually this figure will be increased to 116. Their general characteristics are as follow :—

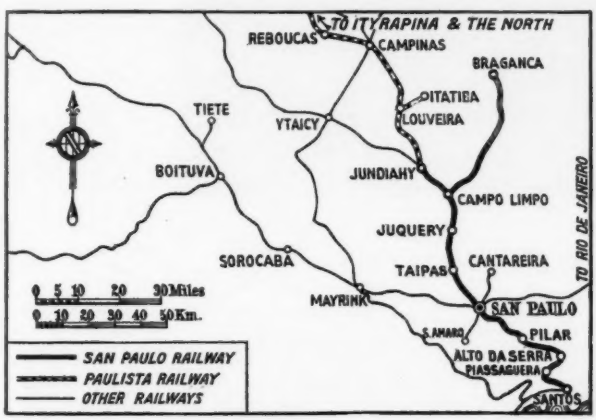
Length	10·973 m. (36 ft. 0 in.)
Width	3·022 m. (9 ft. 11 in.).
Freight space (10·769 by 2·858 m.)	30·657 sq. m. (330 sq. ft.)
Distance between bogie centres	7·010 m. (23 ft. 0 in.)
Bogie wheel base	1·676 m. (5 ft. 6 in.)
Maximum height above rails	3·975 m. (13 ft. 0 in.)
Tare weight	19,000 kg. (19 tons)

The steel framework of the body is built up of tubes and angle-iron trusses riveted to the underframe and roof, and the interior of the wagon up to two-thirds of its height is lined with Argentine *lapacho* hardwood ; the flooring is of the same material. The lining of the sides of the body is arranged in the form of a shutter, permitting of perfect ventilation, and the floor planking is studded to prevent slipping ; the floor is slightly cambered to provide for drainage. One bogie on each wagon is equipped with standard vacuum-brake gear, and there are altogether 34 standard parts used, such as buffers, brakes, and draw gear. The fitting of the automatic brake enables much higher speeds to be maintained with safety than has hitherto been customary in the case of livestock traffic.

CABLE-OPERATED INCLINES, SAN PAULO RAILWAY

This Brazilian railway includes one of the few cable-worked main lines carrying heavy traffic

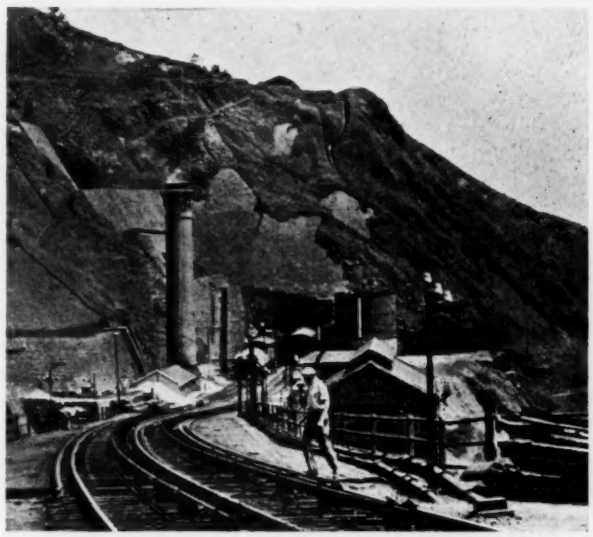
ALTHOUGH the trunk line of the San Paulo Railway (5 ft. 3 in. gauge), extending from Jundiahy through São Paulo to Santos, is only 139 km. long, it forms the main outlet for export merchandise despatched by the big railway systems in the State of São Paulo, and also carries the bulk of the traffic destined to the interior from the port of Santos. The São Paulo—Santos portion is 79 km. long, split up into three well-defined sections, (1) an undulating stretch from São Paulo over a tableland 2,500 ft. above sea level to Alto da Serra, (2) a steep drop down the Serra do Mar to Piassaguéra, and (3) a final run virtually at sea level into Santos. When the San Paulo Railway was opened as a single line in 1867, the ascent and descent of the Serra do Mar were effected by four inclines having a 1 in 10 gradient, worked by rope-haulage on the tail-end system. Duplication was put in hand in 1895 and completed in 1901, when the present main incline, also worked by rope-haulage, but on the endless-rope system, was inaugurated. The old incline is still used for freight traffic when required. By means of the new incline trains are lifted in five stages from little higher than sea level to an elevation of 2,625 ft. The distance from the foot of the first stage to the summit of the fifth is 10 km. and the ruling grade of each stage 1 in 12½.



Map of San Paulo Railway, showing connections with other systems

Traffic Working on the Main Incline

On the arrival of a São Paulo-bound train at Piassaguéra or a Santos-bound train at Alto da Serra, the locomotive is detached and the remaining vehicles are, if they have a gross weight of over 89 tons, broken up into sections, each weighing not more than this figure. Each section is then propelled to the foot of the first stage and drawn to the top of the fifth stage by a small 0-4-0 engine known as a locomotive-brake which grips the rope and transmits its pull to the train. In addition to being fitted with the automatic vacuum brake, the loco-brake carries powerful rail-grip brakes for the descent.

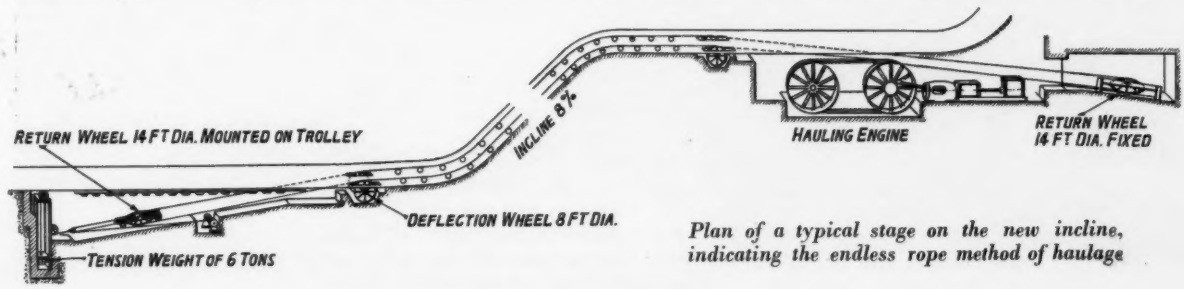


View of the bankhead on new incline. The main or hauling engines are immediately beneath the track at each bankhead

It also has sufficient tractive power to shunt the 89-ton sections along the bankheads, as the level stretches between each incline stage are termed, so as to reach the rope-gripping position. Each loco-brake is fitted with mechanism for lifting the rope and holding it fast in the rope-grip placed underneath; once this has been done, the driver, by touching with a brass rod a signal-wire on the side of the track, advises the power-house staff that his train is ready. Instruments indicate when all five power-house drivers are ready to start and the trains on all five stages start simultaneously, so that there are five trains ascending and five descending when the incline is working normally.

The Endless Rope System

The five main or hauling engines are located beneath the track at the respective bankheads and the wire rope for hauling the sections or trains up and letting them down the incline enters each engine-house from the up line and makes four turns round the rope-wheels, passing to a 14-ft. diameter return wheel at the back of the power-house and thence passing out on to the down line. Each rope has a resistance to breaking of 108 tons when new and is renewed when or before its strength is reduced by wear to 72 tons, and as the maximum working load on the rope from all sources is 18 tons, the factor of safety varies from 6 to 4. The rope is


RETURN WHEEL 14 FT DIA. MOUNTED ON TROLLEY
INCLINE 8%
HAULING ENGINE
RETURN WHEEL 14 FT DIA. FIXED
DEFLECTION WHEEL 8 FT DIA.
TENSION WEIGHT OF 6 TONS

Plan of a typical stage on the new incline, indicating the endless rope method of haulage

Section of passenger train on new or main incline, and old or reserve incline on the left. Note the "three rail" formation between crossing places, one of which may be seen clearly on the old line

Crossing place on second stage of new incline; in the foreground is the "three rail" layout necessary to accommodate two sets of pulley-wheels. In the near distance is the continuation of the main line from Piassaguéra (foot of incline) to Santos

guided by revolving pulley-wheels between the tracks, passing underground at the foot of each stage, where a tension slide and tension weight of 6 tons return the endless rope from one line to another and also hold it continually taut over the pulleys.

The track on the incline stages has been laid out to suit the most convenient method of locating the up and down sides of the rope; as a single line is inadequate for two sets of pulley-wheels, three rails have had to be laid, except at the bankheads and intermediate crossing-places, where naturally the line opens out to double track.

Capacity of the Incline

The average weight of train which can be hauled on any one stage is 120 tons, composed, in the case of freight trains, of 6 loaded wagons weighing 89 tons and the loco-brake weighing 31 tons; 46 tons of this total is paying load. As 9 min. are required to run a trip on a stage—7½ min. running time and 1½ min. for change-over from one rope to the next on the bankhead—the hourly average number of trips is 6⅔, and, therefore, some 300 tons an hour can be delivered at the top and bottom of the incline; or, based on 14½ hr. devoted to freight traffic, approximately 4,500 tons a day. The lighter passenger trains can be dealt with in one section, but others, especially the heavy services at week-ends and holiday periods, have to be divided on the incline, trips following one another on each stage at specified 9-min. intervals.

Some of the main advantages of the endless rope system of haulage may be enumerated:—

(1) The dead load is normally balanced, that is to say, the vehicles and loco-brake forming the up trip are approximately balanced by a similar number of vehicles and loco-brake on the down side of the rope.

(2) The duty of the stationary or main engine on each stage is to overcome the excess or unbalanced load, whether arising merely from friction or from difference in the weight of train on one or other side of the rope.

(3) The rope itself is balanced, the proportions of its weight being equal on both up and down sides.

(4) A train may be run on one side of the rope only, owing to the constant tension in the rope caused by the tension weight. In this case the unbalanced load is obviously the total weight of the train.

(5) The system is perfectly safe, even should a train become detached from the rope, which is almost impossible, owing to the adoption of special mechanism designed to prevent such an occurrence.

AXLEBOX SERVICE IN SOUTH AFRICA

A new portable hydraulic axlebox press

UNDER the severe conditions prevailing on the South African Railways British Timken roller bearing axleboxes have in some cases completed over half a million miles running without adjustment or trouble of any kind and with negligible oil consumption. Examples of outstanding reliability and endurance have been demonstrated, as for instance 300,000 miles of trouble-free running with Timken axleboxes fitted to the leading bogies and trailing trucks of one class of South African locomotive; oil consumption is one pint a year for each axlebox. Over 500 of these axleboxes were fitted to Class "19D" 4-8-2 engines from 1938 onwards, and reports show that there were no bearing failures and no loss of oil. Some of the axleboxes have now completed 150,000 miles running.

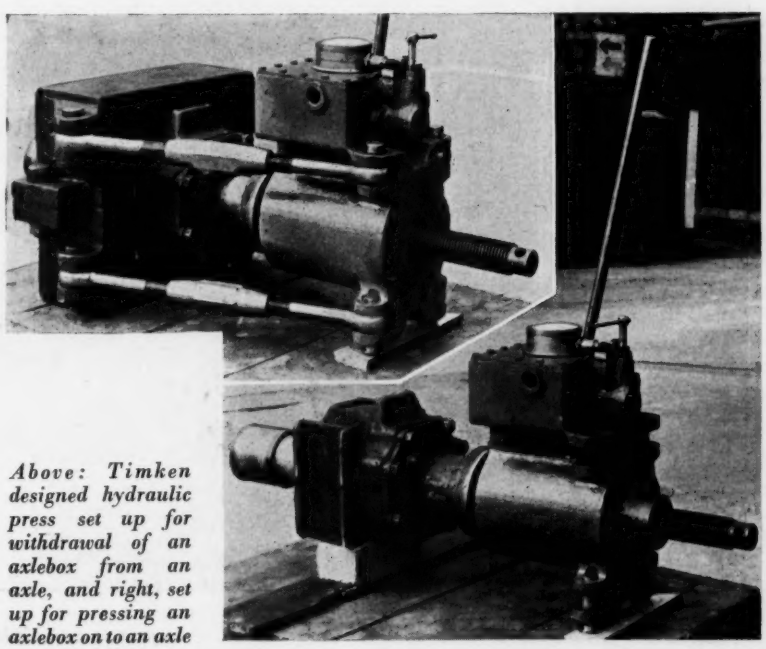
Even more noteworthy has been the performance of Timken axleboxes fitted to a number of Metropolitan-Vickers electric locomotives in 1937. Several of these have now completed over 500,000 miles, and the remainder only slightly less, entirely without trouble. Oil consumption is said to be negligible, and the boxes are merely washed out once a year and then refilled with new oil.

All the coaches making up the two special Blue trains running between Johannesburg and Cape Town are fitted with these axleboxes, as well as all new dining cars, and of more than 1,000 axleboxes of this type none, it is reported, have failed in service. Some of them have already completed 300,000 miles running with the same negligible oil consumption.

The task of mounting axleboxes in position on the axle and removing them when required can be the more readily achieved by the use of a suitable press. To meet this requirement British Timken Limited has developed the unit illustrated on this page. It is a portable hydraulic concentric press designed to provide a tool capable of a pressure of 75 tons and which, at the same time, has the advantage of portability. The press can be lifted by two men, and is particularly useful in emergency and in inconvenient situations.

Timken axlebox bearings always have their inner races press-fitted on to the axle; this is standard practice, as in wheel fitting, but it has been open to the objection that the use of a wheel press is involved. This objection has been removed by the introduction of the new press.

Two models are available, one operated by hand and the other by power. With either of these an axlebox can be mounted or removed in ten minutes, including time for setting up. In the event of power failure, the power unit can be used for hand operation; a safety device prevents the handle used for this purpose being attached while power is available. There are many additional uses for this hydraulic press in engineering workshops.



Above: Timken designed hydraulic press set up for withdrawal of an axlebox from an axle, and right, set up for pressing an axlebox on to an axle

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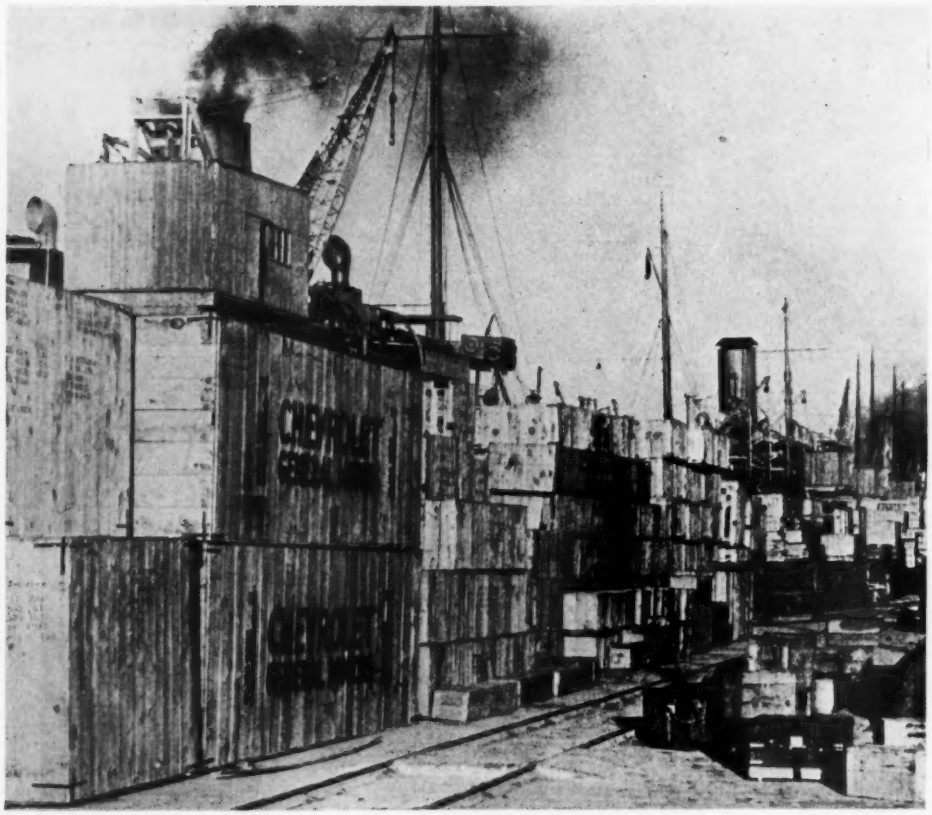
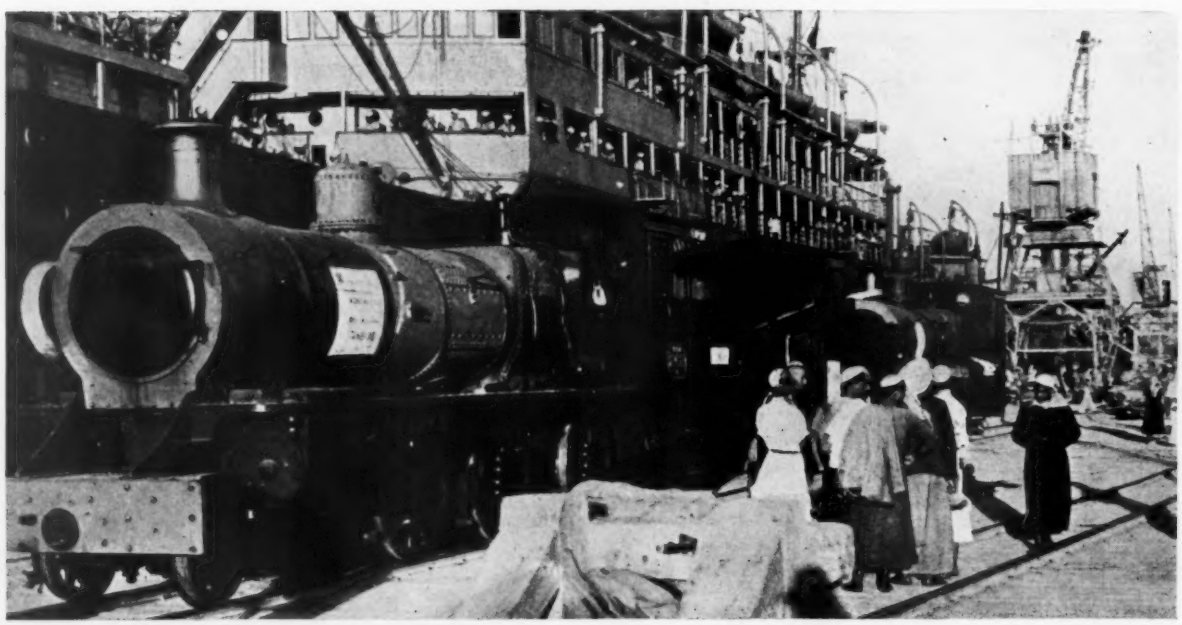
Railways and the War—93



Deliveries of United States materials at a Middle East port



Locomotives from Indian railways after their arrival at a port in the Middle East where they will help the war effort of the Allies

RAILWAY NEWS SECTION

PERSONAL

L.N.E.R. APPOINTMENT

Mr. N. Newsome, Technical Assistant to the Chief Mechanical Engineer, Doncaster, has been appointed Assistant to Carriage & Wagon Works Manager, at Stratford, as from December 1.

Mr. J. T. Mount has been appointed Assistant District Goods Manager, London, G.W.R. He began his railway career in 1907 in the Chief Goods Manager's Salvage Department and has seen service in various sections of the Chief Goods Manager's Office. From 1914 to 1919 he served with H.M. Forces, was commissioned in the Indian Army, and attached to a Frontier Force Regiment. In 1930 he became First Assistant in the Chief Goods Manager's Office, Private Sidings Section, and in 1939 was appointed Clerk-in-charge.

Mr. J. T. Mount

Appointed Assistant District Goods Manager, London, G.W.R.

Prof. Dr. J. Goudriaan, the President, of the Netherlands Railways, has resigned, and the Vice-President, W. Hupkes, has been appointed Acting-President. Prof. Goudriaan is known to have been at variance with the German Occupation Forces on a number of occasions, and he was held in a concentration camp for a period earlier this year. His resignation must have been forced on him by the Germans either directly or by their actions.

Lord Cadman, F.R.S., whose death we recorded in our June 6 issue, has left estate valued at £234,748 (net £210,164). Lord Cadman was Chairman of the Anglo-Iranian Oil Co. Ltd., and a Director of the Great Western Railway as well as of numerous other commercial undertakings.

We regret to record the death on November 25 of Mr. L. H. Walters, Joint Deputy Chairman of the Midland Bank Limited.

Mr. D. Hawkeswood has been appointed Assistant District Goods Manager, Bristol, G.W.R., in succession to Mr. Bolton. Mr. Hawkeswood entered the railway service in the Chief Goods Manager's Rates Department in 1911, and saw service in France and Flanders from 1916 to 1919 and subsequently with the Rhine Army. Shortly after his return he was appointed Personal Clerk to the Assistant Goods Manager (Rates Department), and from 1922 to 1927 was Personal Clerk successively to two Chief Goods Managers—Mr. E. Lowther and the late Mr. E. Ford. In 1928 Mr. Hawkeswood was placed in charge of the Continental Department, Chief Goods Manager's Office, and six years later was associated with the formation of a new department to deal with matters arising out of the Road & Rail Traffic Act, 1933. In 1935 he was appointed Clerk-in-Charge of the Working Department, Chief Goods Manager's Office. Early in 1940 he became Assistant District Goods Manager, London.

Mr. D. Hawkeswood

Appointed Assistant District Goods Manager, Bristol, G.W.R.

THE INSTITUTE OF TRANSPORT

The council has approved the following elections to corporate membership :—

Members

Mr. D. L. Clarke, O.B.E., Chairman, Northern Ireland Road Transport Board.

Mr. C. Grasemann, Public Relations & Advertising Officer, Southern Railway.

Senhor F. Pinto Teixeira, General Manager, Mozambique Railways & Harbours.

Mr. L. H. Short, M.C., English Electric Co. Ltd.

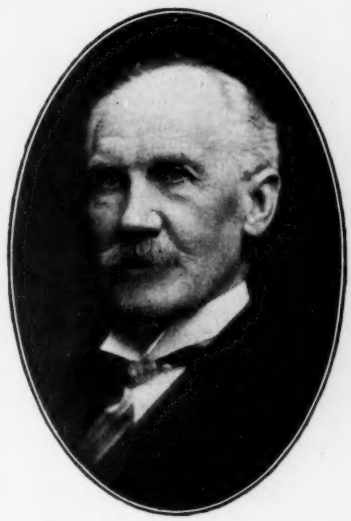
Associate Members

Mr. J. L. Grumbridge, L.M.S.R.

Mr. C. L. Newbury, G.W.R.

Lord Austin, Founder & Chairman of the Austin Motor Co. Ltd., whose death we recorded in our June 6 issue, has left estate valued at £509,712 (net £396,378).

We regret to record the death on November 22 of Mr. John Scouler Steven, Solicitor, Scotland, London Midland & Scottish Railway Company, 1923 to 1926. Mr. Steven, who was in his 80th year, was born in the Royal Burgh of Rutherglen, and educated at the Glasgow Athenæum & Glasgow University. He joined the staff of the Caledonian Railway Company in 1889, and in 1908 was appointed Assistant Solicitor. In 1921, after a short period during which he acted as Solicitor jointly with the late Mr. D J. Forgan, he became Solicitor. On the formation of the London Midland & Scottish Railway, he was appointed Solicitor, Scotland, and retired from this position in 1926. During his tenure of office with the Caledonian Railway, Mr. Steven was associated with many important developments, including the Glasgow Central Railway, the Mid-Lanarkshire lines, the Grangemouth Docks, the Leith lines, the Glasgow Central station, the Ballachulish Extension Railway, the Gleneagles hotel and golf courses, and the amalgamation proceedings.



The late Mr. J. S. Steven

Solicitor, Scotland, London Midland & Scottish Railway Company, 1923-1926

At the annual ceremony of nomination of sheriffs, which took place at the Law Courts on November 12, Lt.-Colonel Reginald Tristram Harper, O.B.E., was one of the three nominees for the County of Surrey. Lt.-Colonel R. Tristram Harper, O.B.E., is a Director of the Buenos Ayres Great Southern Railway Co. Ltd., the Buenos Ayres Western Railway Limited, the Bahia Blanca & North Western Railway Co. Ltd., and of the Buenos Ayres, Ensenada & South Coast Railway Co. Ltd.

We regret to record the death in England on September 1, as the result of a flying accident, of Pilot-Officer J. H. Darley, formerly Assistant to the Locomotive Works Manager of the Buenos Ayres Great Southern and Buenos Ayres Western

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Railways. Mr. Darley was educated at Eton, and served his apprenticeship as a mechanical engineer with Vickers Limited, and studied at Sheffield University. He joined the B.A.G.S. Railway in July, 1921, and occupied various posts in the Chief Mechanical Engineer's Department, eventually becoming Assistant to the Locomotive Works Manager. Early in the present war he left for England to join the Royal Air Force.

We regret to record the death, at the age of 57, of Mr. P. M. Gault, Signal Engineer of the Missouri Pacific Railroad system and well known in signal engineering circles in America. He began his railway career in the Signal Department of the Pennsylvania Lines West, and in 1913 joined the Illinois Central System, eventually becoming Assistant Signal Engineer. He was appointed Signal Engineer to the Missouri Pacific Railroad in 1927. Mr. Gault attended the annual dinner in London of the Institution of Railway Signal Engineers in October, 1938, and gave details of the latest progress achieved in American signal engineering. Mr. Gault was Chairman of the Signal Section of the Association of American Railroads in 1930.

The death took place on November 15 of Brigadier-General Sir Arthur Long, K.B.E., D.S.O., at the age of 75. Sir Arthur had a most distinguished Army career and his work in the organisation and maintenance of transport and supplies in the Balkans during the last war was of outstanding merit and importance.

Indian Railway Staff Changes

Mr. A. E. Tylden-Pattenson, C.S.I., General Manager, G.I.P.R., has been permitted to retire from Government service as from June 6.

Mr. J. A. Tower has been confirmed permanently as Chief Transportation Superintendent, G.I.P.R., as from June 6.

The services of Mr. C. M. Cock, Traction Superintendent, G.I.P.R., have been placed at the disposal of the Royal Indian Navy as from June 1.

Mr. J. A. Morris has been appointed to officiate as Deputy Chief Mechanical Engineer, E.I.R., as from June 9.

Mr. T. G. R. Eagan has been appointed to officiate as Deputy Chief Engineer, N.W.R., as from September 3.

Mr. C. N. Silvester has been appointed to officiate as Deputy General Manager (on special duty), E.B.R., as from September 3.

Mr. R. B. Seth has been appointed to officiate as Deputy General Manager, Works & Secretary, E.B.R., as from September 3.

Rai Bahadur N. C. Ghosh has been confirmed as Chief Operating Superintendent, E.I.R., as from August 13.

Mr. W. Hood has been confirmed, in a provisionally permanent capacity, as Deputy Chief Engineer Construction, G.I.P.R.

Mr. B. C. L. Bean, O.B.E., V.D., Divisional Superintendent, N.W.R., has been permitted to retire from Government service as from September 4.

The Home Secretary & Minister of Home Security has received with regret the resignation of Mr. Harold Butler as Regional Commissioner in charge of the Southern Civil Defence Region, in order to enable him to return to his post of Warden of Nuffield College. The Home Secretary has agreed that, as Mr. Butler's previous experience had given him special qualifications for the kind of work now being undertaken by Nuffield College, including its work for the Government in connection with reconstruction problems, it was his duty to return to the College. Mr. Butler will vacate his present office on December 31. Mr. Morrison has conveyed to Mr. Butler the thanks of the Government for the service he has rendered in the creation and development of the organisation of the Southern Civil Defence Region, of which he has been in charge for approximately two-and-a-half years.

As a memorial to Lord Stamp of Shortlands, President of Beckenham Hospital, and Lady Stamp, a member of the board of management, who lost their lives through enemy action in April, it is proposed to erect and equip a chapel to be called the "Stamp Memorial Chapel," to form a centre of the spiritual life and work of the hospital. The erection of the chapel will be proceeded with as soon as circumstances permit, and in the meantime subscriptions will be invested in Government War securities. Gifts may be sent to Mr. H. J. Welch, Chairman of the Beckenham Hospital, Beckenham, Kent.

A Memory of Peacetime

The 4 p.m. Coronation and 4 p.m. Leeds expresses abreast at Gasworks tunnels, King's Cross, L.N.E.R. Streamlined 4-6-2 locomotive No. 4467, Wild Swan, heading the Coronation, and non-streamlined 4-6-2 locomotive No. 4480, Enterprise, the Leeds train

Photo] [George R. Grigs

TRANSPORT SERVICES AND THE WAR—118

Reduction of railway passenger services—Standing passengers in London buses—Limitation of coal for Ireland—Freight traffic in Germany—Aid to Russia through Persia

In the House of Commons on November 26 Colonel J. J. Llewellin, Parliamentary Secretary to the Ministry of War Transport, in answer to a Question stated that the railways were working under heavy pressure due mainly to two factors, of both of which we should be proud. One was the increasing production of munitions and of coal in this country, the other the fact that we had sent abroad a substantial number of our best locomotives in order to assist the Russian armies. Freight traffic essential to the war effort had to have the transport it needed. It was therefore necessary to reduce passenger services not only through the Christmas period but throughout the winter months. It has been decided to withdraw a further number of long-distance passenger trains, all restaurant cars on congested routes, and a substantial number of sleeping cars.

MORE PULP FOR THE MILLS

By reducing the size of bus timing-cards, London Transport will save more than 10 tons of paper a year.

These cards are used by conductors for recording the time of their arrival at 168 points along the routes.

A simple alteration to be made in the mechanism of the time-clocks will permit half-sized cards to be used.

Constant search is being made to discover ways in which quantities of paper, however small, can be saved.

Over 1,000 tons of paper a year are now being saved by economy and salvage in order to assist the war effort.

On the same day the Railway Executive Committee announced that as from Monday, December 8, the following trains on the L.N.E.R. main line would be withdrawn: On weekdays the 9.50 a.m. Newcastle—King's Cross, the 1.5 a.m. Edinburgh—King's Cross, the 12.45 p.m. King's Cross—Newcastle, and the 1 p.m. King's Cross—Edinburgh; on Sundays the 10.30 a.m. Newcastle—King's Cross, and the 1 p.m. King's Cross—Newcastle. All restaurant cars and buffet cars attached to trains operating between King's Cross and Newcastle or Edinburgh were also to be withdrawn. In addition the ten first class sleeping cars which were at present running nightly in each direction over the L.N.E.R. east coast main line to and from King's Cross were to be reduced to four each way: one to and from Aberdeen, two to and from Edinburgh, and one to and from Newcastle. The restaurant trains, buffet cars, and sleeping cars that were to be taken off would be replaced by ordinary coaches. In the following table the services between King's Cross, Newcastle, and Edinburgh are shown, and the trains which are to be withdrawn are indicated in heavier type:—

	WEEKDAYS							
King's Cross	4.30 p.m.	9.50 a.m. (r)	10. 0 a.m. (r)	**12. 45 p.m. (r)**	**1. 0 p.m. (r)**	3.50 p.m. (r)	4. 0 p.m. (r)	
Newcastle	12.10 p.m.	3.39 p.m.	4. 0 p.m.	**6.40. p.m.**	**6.51 p.m.**	9.50 p.m.	11.13 p.m.	
Edinburgh	3.35 p.m.	6.37 p.m.	6.45 p.m.	—	**9.50 p.m.**	—	—	
King's Cross	5.30 p.m. (r)	7.15 p.m. (r)	8.20 p.m.	10.15 p.m.	10.25 p.m. (s)	11.15 p.m. (e, r)		
Newcastle	11.30 p.m.	1.17 a.m.	3.47 a.m.	4.13 a.m.	5.52 a.m.	6.25 a.m.		
Edinburgh	—	4.10 a.m.	7. 0 a.m.	7.15 a.m.	—	12.47 p.m.		
	SUNDAYS							
King's Cross	10.50 a.m. (r)	11. 0 a.m. (r)	**1.0 p.m.(r)**	5. 0 p.m. (r)	7.15 p.m. (r)	8.20 p.m.	10.15 p.m.	11.15 p.m.
Newcastle	5.20 p.m.	6.5 p.m.	**7.20 p.m.**	11. 5 p.m.	1.17 a.m.	3.47 a.m.	4.13 a.m.	6.25 a.m.
Edinburgh	8.15 p.m.	9 .0 p.m.	—	—	4.10 a.m.	7. 0 a.m.	7.15 a.m.	12.47 p.m.
	WEEKDAYS							
Edinburgh	—	—	—	10.0 a.m. (r)	10.10 a.m. (r)	**1. 5 p.m. (r)**		
Newcastle	1.10 a.m.	8. 5 a.m. (r)	**9.50 a.m. (r)**	12.45 p.m. (r)	12.55 p.m. (r)	**4. 0 p.m. (r)**		
King's Cross	7.35 a.m.	1.59 p.m.	**4.10 p.m.**	6.30 p.m.	7.15 p.m.	**10.21 p.m.**		
Edinburgh	2.30 p.m. (r)	5.18 p.m. (r)	10. 0 p.m.	10.30 p.m. (e)	10.30 p.m. (s)			
Newcastle	6.35 p.m.	10.45 p.m.	12.55 a.m.	—	—			
King's Cross	2.40 a.m.	6. 0 a.m.	7.10 a.m.	10. 6 a.m.	11.58 a.m.			
	SUNDAYS							
Edinburgh	—	—	—	11.15 a.m. (r)	11.25 a.m. (r)	—	10. 0 p.m.	10.30 p.m.	—
Newcastle	1.10 a.m.	**10.30 a.m. (r)**	10.35 a.m. (r)	2. 2 p.m. (r)	2.25 p.m. (r)	6.35 p.m.	12.55 a.m.	—	10.45 p.m.
King's Cross	7.35 a.m.	**5. 1 p.m.**	5.20 p.m.	8.20 p.m.	9.28 p.m.	2.40 a.m.	7.10 a.m.	10. 6 a.m.	6. 0 a.m.

r = refreshment car. *s* = Saturdays only. *e* = Saturdays excepted.

The Railway Executive Committee on November 7 stated that restaurant cars would be withdrawn on December 8 from certain trains on all four main lines. The trains affected will be as follow:—

G.W.R.

Weekdays: 8.55 a.m. Paddington—Swansea; 1.45 p.m. to Wolverhampton; 1.55 p.m. to Swansea; 4.5 p.m. to Shrewsbury; 6.35 p.m. to Cheltenham; 7.15 a.m. Cheltenham—Paddington; 7.30 a.m. Shrewsbury—Paddington; 10.15 a.m. Cardiff to Paddington; 2.50 p.m. Swansea to Paddington; 3.25 p.m. Wolverhampton to Paddington.

Sundays: 12.30 p.m. Paddington to Swansea; 3.25 p.m. Swansea to Paddington.

L.N.E.R.

Weekdays: 9.50 a.m. King's Cross to Edinburgh; 10 a.m. King's Cross to Edinburgh; 3.50 p.m. King's Cross to Newcastle; 5.30 p.m. King's Cross to Newcastle; 7.15 p.m. King's Cross to Aberdeen (restaurant car King's Cross to York); 8.5 a.m. Newcastle—King's Cross; 8.52 a.m. Darlington to King's Cross; 10 a.m. Edinburgh to King's Cross; 10.10 a.m. Edinburgh to King's Cross.

Sundays: 10.50 a.m. King's Cross to Edinburgh; 11 a.m. King's Cross to Edinburgh; 5 p.m. King's Cross to Newcastle; 7.15 p.m. King's Cross to Aberdeen (restaurant car King's Cross to York); 10.35 a.m. Newcastle—King's Cross; 11.15 a.m. Edinburgh—King's Cross; 11.35 a.m. Edinburgh to King's Cross.

TANKS FOR
ATTACK!
We all want to win the war as quickly as possible. This cannot be done without building up vast reserves of tanks, guns, bombers and all other equipment of war.
To speed on the day of attack, the Railways are carrying every week millions of tons of raw materials to the factories, moving tens of thousands of troops and thousands of tanks, guns, aircraft and other war materials.
This means fewer trains for you, more overcrowding, less peacetime service. Travel only when you must.
BRITISH RAILWAYS
GWR—LMS—LNER—SR
A British Railways advertisement

L.M.S.R.

Weekdays: 10 a.m. Euston—Glasgow (Central); 10.5 a.m. Euston to Perth; 1 p.m. Euston to Glasgow (Central); 10 a.m. St. Pancras to Glasgow (St. Enoch); 10 a.m. Glasgow (Central) to Euston; 8.40 a.m. Perth to Euston; 1 p.m. Glasgow (Central) to Euston; 10 a.m. Glasgow (St. Enoch) to St. Pancras.

Sundays: 10 a.m. Euston to Glasgow (Central); 10 a.m. St.

Pancras to Glasgow (St. Enoch); 10 a.m. Glasgow (Central) to Euston; 10 a.m. Glasgow (St. Enoch) to St. Pancras.

Canteens for troops will be withdrawn from the following L.M.S.R. trains: 10 and 1 p.m. Euston to Glasgow (Central); 10 and 1 p.m. Glasgow (Central) to Euston.

The number of sleeping cars on the L.M.S.R. London-Scottish services will be curtailed also.

On the Southern Railway already more than 100 restaurant, buffet, and Pullman cars have been withdrawn and further curtailments will be announced.

Services and Christmas Leave

Leave involving travel by rail between December 24 and December 28 is not generally to be accorded to Service personnel, and evacuated Government departments are granting no free travel permits over the Christmas period.

Women Trolleybus Drivers

The first women drivers of trolleybuses to be licensed in this country received their driving certificates on November 13 from Major F. S. Eastwood, the Yorkshire Regional Traffic Commissioner. On that occasion three women were licensed, all for Rotherham Corporation Transport.

More Standing Passengers in London Buses

As from November 20, the number of standing passengers which may be carried on London Transport buses between midnight and 7.30 p.m. has been increased. However, it must not exceed half the number for which the vehicle (or in the case of a double-deck vehicle, the lower deck) has seating capacity, or 12, whichever is the smaller number. Between 7.30 p.m. and midnight, the number of standing passengers permitted remains as heretofore, varying from 6 to 8 according to the type of bus.

Limitation of Coal for Ireland

In furtherance of recent sweeping plans to reduce the coal transport burden of the railways, notice was given on November 24 that no colliery more than 30 miles from a recognised loading port will be permitted to send forward coal for Ireland. The distance is not the radial mileage, but the railway mileage from pit to pier. It is calculated that Lanarkshire collieries will be excluded from sending any further supplies. Ayrshire is the natural market for Irish business, and the chief result of the new decision will be to concentrate trade in that area.

L.N.E.R. War Efforts

Since the beginning of the war the L.N.E.R. has run more than 18,000 special trains for the conveyance of Army, Navy, and Air Force personnel and equipment.

Nearly 23,000 members of the L.N.E.R. staff are now serving in the Home Guard.

Over 21,000 L.N.E.R. men have joined H.M. Forces. Of these 139 have been killed and 251 are listed as missing or prisoners of war.

Some 20,000 women are today employed by the L.N.E.R., and approximately half the number have taken over men's jobs.

Some Bus Service Facts

Crosville Motor Services Limited, which is a subsidiary of the London Midland & Scottish Railway Company, the Great Western Railway Company, and Tilling & British Automobile Traction Limited has issued, in the form of advertisements, a series of information bulletins for the benefit of its travellers. These contain facts about the operation of the services in wartime. It is pointed out that one-third of each fare received goes in taxes. Out of every 1s. received, the company pays 4d. to the Government, and receives 8d. for operating; the shareholders get three-tenths of a penny. The company has 1,100 conductors each making separate sales to 338 customers every day they are on duty. In one year 117,000,000 sales are made, and one customer in every 112,000 writes to the company a letter of suggestion or complaint. These letters are all analysed and receive replies.

Southern Railway Train Alterations

Train service improvements by the Southern Railway have recently become effective. A relief restaurant car express to the 3.30 p.m. from Waterloo leaves at 3.25 p.m., calling only at Winchester, Southampton, and Brockenhurst, and reaching Bournemouth Central at 5.50 p.m. and Bournemouth West at 6.2 p.m.—an acceleration of 31 min. The 4.35 p.m. to Bournemouth runs non-stop from Brockenhurst to Bournemouth Central, arriving at 7.2 p.m., an acceleration of 20 min.; connection for stations from Sway to Boscombe inclusive is given by a new 6.10 p.m. stopping train from Woolston to Southampton and Bournemouth. In the up direction the 2.20 p.m. restaurant car express from Bournemouth West leaves Bournemouth Central independently at 2.32 p.m. for Southampton, Woking, and Waterloo only, arriving at Waterloo at 4.55 p.m., ahead of the 1.35 p.m. from Weymouth, which no longer carries a restaurant car, and arrives at 5.8 p.m., or 13 min. later than hitherto. A restaurant car runs on the 10.20 a.m. from Bournemouth West to Waterloo, due at 12.55 p.m. The 1.10 a.m. express from Waterloo to Plymouth leaves at 1.25 a.m., calls at Wimbledon at 1.40 a.m., and is accelerated 15 min.; and the 10.45 p.m. from Surbiton to Southampton starts from Waterloo at 10.30 p.m., giving a through service 5 min. quicker than hitherto.

Freight Traffic in Germany

The German State Railway advertisement reproduced this week is the sixth and concluding one of the series. The text contained in the circle, which is common to the whole series, may be translated as follows :—

The goods traffic with which the German Reichsbahn has to deal in Greater Germany has increased enormously. The four-year-plan, armaments, the feeding of the population, and above all the requirements of our Armed Forces, make the greatest demands on the rolling stock. Everything therefore depends on using every available goods vehicle to the utmost.

The individual wording underneath the picture conveys the following message :—

EVERY MAN IS OF MOMENT

Just one man short, just one man in the wrong place, and the smooth working is interrupted. One piece of mechanism forgotten—and the result is that a wagon, which is urgently required elsewhere, stands idle. Every single man is of importance when it comes to supplying and saving labour. Everything must be done to avoid useless standing time. Every bit of labour for loading and unloading must be planned exactly beforehand.

By proper distribution of the goods to be forwarded, by booking wagons in good time, by making out carefully and punctually the way-bills and other documents, the sender's employee can contribute to expediting the goods traffic. He can also save wagon space by loading every vehicle to its maximum capacity—in traffic within Germany up to 1,000 kg. above the carrying capacity marked on the vehicle. At present such loading to capacity is still frequently neglected because the order and delivery conditions stipulate the delivery of fixed quantities without taking into consideration the use of the full capacity of the wagons, for instance 15,000 kg., though the vehicle could hold 18,500 kg. Senders should therefore adapt their orders and delivery conditions to the increased weights which are necessary for loading wagons to capacity. Packers who use the wagon space by skilful stacking of the goods, and carters who shorten the loading and unloading time by punctual delivery and removal of goods—these all render welcome help to the German Reichsbahn in its efforts to meet all goods traffic demands with the available rolling stock.

Help the German Reichsbahn and you help yourself

In addition, this (and all the advertisements of the series) has a panel containing the 10 important rules for consignors which we set out at page 422 of our October 24 issue.

The transport of parcels and of other piece goods by rail from Hamburg, Karlsruhe, Stuttgart, Lübeck, and Berlin to Breslau, Frankfort-on-Oder, Glozau, and other points in the East, has been banned, according to the *Kölnischer Zeitung* of October 28, with the exception of quickly perishable goods, army stores, and so forth.

In the past the German authorities have held the view that water carriage was unsuitable for parcels conveyance, but the heavy traffic which the German railways are now being called upon to handle has caused at any rate a temporary modification of this policy, and parcels are now being conveyed by inland waterway where possible. In order to use available boat space to maximum capacity, vessels may no longer be employed for storing goods. New regulations have been issued for speeding up loading operations.

German Passenger Services

The basis of the German wartime passenger services continues to be the timetable which was introduced in May last, (of which we gave details at page 421 of our October 24 issue), but since the publication of this timetable there have been various announcements of curtailments. The first was made on May 21 and recorded the withdrawal of 21 important express trains. Subsequently the curtailment of approximately 25 per cent. of the passenger service was announced, and further withdrawals resulted in the passenger train service being reduced by about one third by the end of October.

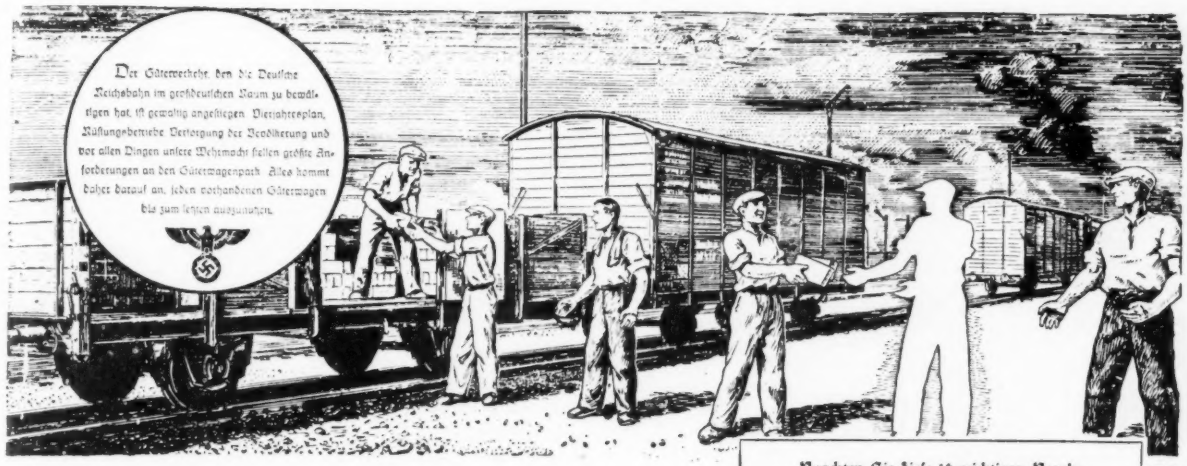
All German railway services to holiday resorts and large towns have been reserved between December 10 and March 31 for the use of army personnel and those persons engaged exclusively in war industries. Hotels and rooms may not be booked without official permission and reservations which have already been made must be cancelled. The only exception to this general rule is made in favour of mothers with children under six years of age, and elderly infirm persons from bombed areas.

Railway Developments in Turkey

The Turkish Government is reported to be proceeding rapidly with urgent new railway works in Asiatic Turkey, and the following notes summarise the progress to date :—

The 159-km. (99-mile) section of the Diarbekr-Cizre-Iraq frontier line has reached Kurtalan. The portion from Diarbekr as far as Bismil has been open to traffic since September 1, 1940. It is expected that the remainder will be in operation by the end of the present year.

Work is proceeding on the 70-km. (43-mile) section between Mamuret el Aziz and Palu of the line from Mamuret el Aziz, *via* Van, to the Persian frontier at Qutur. This section entails the construction of a large number of tunnels and bridges. Work is about to begin on the 64-km. (40-mile) section between Palu and


Der Güterverkehr, den die Deutsche Reichsbahn im großdeutschen Raum zu bewältigen hat, ist gewaltig angestiegen. Vierjahresplan, Rüstungsbetriebe, Versorgung der Bevölkerung und vor allen Dingen unsere Wehrmacht stellen größte Anforderungen an den Güterwagenpark. Alles kommt daher darauf an, jeden vorhandenen Güterwagen bis zum letzten auszunutzen.

Auf jeden Mann kommt es an!

Nur ein Mann zu wenig, nur ein Mann am falschen Platz und schon stockt der glatte Ablauf der Arbeit. Nur eine mechanische Hilfe vergessen - und schon steht ein Güterwagen nutzlos herum, der an anderer Stelle dringend benötigt wird. Im Einsatz und im Einsparen von Menschenkraft kommt es auf jeden einzelnen Mann an. Alles muß getan werden, um nutzlosen Stillstand auszumerzen. Jeder Kräfteeinsatz zum Be- und Entladen muß vorher genau geplant sein.

Der Angestellte des Verfrachters kann durch geschickte Verteilung der zu verladenden Güter, durch rechtzeitige Wagenbestellung, durch pünktliche und genaue Ausfertigung der Frachtbriefe und sonstigen Begleitpapiere zur Beschleunigung des Güterverkehrs beitragen. Ferner kann er Wagenraum sparen, wenn er jeden Wagen bis zur Höchstgrenze auslastet, im innerdeutschen Verkehr bis zu 1000 kg über die am Wagen angeschriebene Tragfähigkeit. Jetzt unterbleibt diese Auslastung noch oft, weil die Bestellschreiben und Lieferbedingungen ohne Rücksicht auf die Auslastung der Wagen die Lieferung bestimmter Mengen vorsehen, z. B. von 15 000 kg, obwohl der Wagen 15 500 kg fassen könnte. Daher Bestellschreiben und Lieferbedingungen den erhöhten Gewichtsmengen anpassen, die zur Auslastung der Wagen notwendig sind. Die Packer, die den Wagenraum durch geschichtes Stapeln der Güter ausnutzen, die Fahrer, die durch pünktliche Zu- und Abfuhr der Güter die Be- und Entladezeiten abkürzen - sie alle sind der Deutschen Reichsbahn willkommene Helfer bei ihren Bemühungen, mit den vorhandenen Güterwagen alle Ansprüche des Güterverkehrs zu erfüllen.

Hilf der Deutschen Reichsbahn und Du hilfst Dir selbst!

Beachten Sie diese 10 wichtigen Regeln für den Verfrachter!

1. Güterwagen schnellstens be- und entladen. Rückgabe der Wagen möglichst vor Ablauf der Ladefristen. Unverzügliche Anzeige der Ladefertigkeit hat Ausfall wertvollen Laderaums zur Folge.
2. Wagen rechtzeitig und nur für den tatsächlichen Bedarf bestellen. Angebotene Eisenbahnwagen verwenden, selbst wenn kleine Unbequemlichkeiten damit verbunden sind.
3. Pünktliche An- u. Abfuhr der Güter. Mit der Be- und Entladung sogleich nach Wagenbereitstellung beginnen.
4. Für Güterwagen gibt es jetzt keine Sonntagsruhe. Daher Güter, wenn möglich, auch Sonntags verladen. Für eingegangene Güter besteht die Pflicht zur Entladung an Sonntagen.
5. Güterwagen beim Be- und Entladen nicht beschädigen. Lademaße einhalten. Güter ordnungsmäßig und betriebssicher verladen.
6. Durchgemischtige Ladegeräte und Hilfsmittel das Be- und Entladen erleichtern.
7. Auslastung der Wagen bis zum Ladegewicht und nach Möglichkeit jene im innerdeutschen Verkehr bis 1000 kg über die am Wagen angeschriebene Tragfähigkeit. Raumverpuenie durch geschichtes Stapeln der Güter ganz besonders durch sachgemäßes und überlegtes Verladen sperriger Güter.
8. Nicht mehr Güter zu gleicher Zeit beziehen, als rechtzeitig entladen werden können.
9. Entladung sogleich beim Eingang der Versandanzeige des Absenders oder bei der Voranzeige durch die Güterabfertigung anderweiten Fahrzeuge und Ladepersonal schon im voraus für die Zeit der bevorstehenden Entladung freihalten.
10. Frachtbriefe und sonstige Begleitpapiere sorgfältig ausfüllen zur Vermeidung von Irrläufen.

Bitte ausschneiden, aufheben und immer wieder lesen!

The sixth, and last, of the German State Railway freight traffic advertisements

Chapakchur, contracts for which were placed this year. The survey of the section of about 100 km. (62 miles) from Chapakchur to Mush will be completed early in 1942 and work is scheduled to begin on this section in the spring. The survey of the section between Mush and Van is finished, and work will be begun shortly on this section if the situation permits.

The line from Zongouldak to Kozlu, which has been under construction for 18 months, will soon be finished. The line is only 4½ km. (2¾ miles) long, but its construction has involved driving a number of tunnels.

The survey of a railway from Bosujuk to Brusa has been completed.

The survey of what is described as the Okchungel section of Bali Kesir to Panderma railway is being made.

Survey of the remaining section of the Adapazar-Bolu-Ismet Pasha line is expected to be completed this year.

The Partition of Greece

Greece under enemy occupation has been divided into the following three zones :—

Western Thrace and Eastern Macedonia up to the River Struma was handed over to the Bulgarians.

Central Macedonia, with Salonika and Crete, is under German occupation.

The rest of the country was transferred by the Germans to Italian occupation.

According to the Turkish press, the railway administrations concerned have arranged to reopen passenger and goods traffic between Istanbul and various European countries on January 1, 1942. Greece has been eliminated from the through traffic, as the Turkish State Railways now make direct contact only with lines in the hands of the Bulgarian State Railways.

Danube Bridge at Bogojevo

In April, 1941, the six-span steel bridge crossing the Danube between Erdut and Bogojevo, and carrying the single-track standard-gauge railway line leading from Vinkovci to Subotica, was blown up by the Jugoslav Forces. Bogojevo (called by the Hungarians Gombos) is on the northern bank of the Danube, now in Hungarian occupation, while Erdut on the southern bank is in what is now known as Croatia. Every effort is being made by the Hungarian State Railways to clear the wreckage on th Hungarian side of the river—consisting of three spans of 328 ft. each—as it may prove a great hindrance to the floating ice. It is thought that the salvage work will be completed by the middle of December. In the early period of the occupation, German pioneers blew a passage about 223 ft. wide through the wreckage of the second span (counting from the northern bank) so as to enable shipping to pass through. As in the case of the Novi Sad bridge, the Croatian State Railways have asked the Hungarian State Railways to clear the remaining three spans lying on the Croatian side of the river, but for lack of time this will not be possible before the ice sets in. Work on the Croatian side, it is stated, will be undertaken in the spring of 1942, after the ice of the Danube has thawed.

It will be recalled that the Vinkovci-Bogojevo-Subotica route was used by the Bucharest section of the Simplon-Orient Express prior to its diversion over the Belgrade-Pancevo line after the completion of the Danube bridge to the north of Belgrade in 1936. Bogojevo is 45 km. (28 miles) and Erdut 39 km. (24 miles), to the north of Vinkovci. Vinkovci itself, on the Belgrade-Zagreb main line, is 158 km. (98 miles) to the west of Belgrade.

Slovak Traffic to the East

It seems that considerable attention is being paid by the German authorities to the establishment of better communications between Slovakia and German-occupied Poland. A motorbus service from Krakow to Vienna, *via* Slovakia, is already stated to be working. Plans are now in hand for the establishment of a new direct railway route from Budapest to Krakow, *via* Neusohl and Ruzomberok. Further reference to the constructional work involved in this scheme was made at page 302 of our September 26 issue.

Transport of Labourers in Austria

A transport office has been established in Vienna to regulate the question of leave traffic for foreign industrial labourers working

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in the Gaue of Vienna, Niederdonau, Oberdonau, Salzburg, Steiermark, and Kärnten. On the basis of information supplied by the employers, this transport office has undertaken to arrange for special leave trains to be run for these foreign labourers. In future individual journeys will be permitted only in very exceptional cases, according to the *Neues Wiener Tagblatt* of October 22.

Jugoslav Frontier Traffic

The railway line between Marburg (Maribor) and Klagenfurt was reopened to traffic on October 20, according to the *Neues Wiener Tagblatt* of October 23, work on the tunnels damaged by the Serbs having been completed. It was also announced that the German railway tariffs would apply from November 1.

Leave Travel Concession in Canada

It was announced at the Headquarters of Military District No. 4 in Montreal on October 18 that all personnel of the Canadian Army, including nursing sisters, proceeding on leave or furlough will be allowed to purchase return tickets at single fare. The new rate is applicable to men travelling in uniform, or in mufti, but in the latter case the soldier must produce a certificate signed by his commanding officer. The regulations state that the fare will be single, with a minimum of 25 cents, for the round trip in the case of first class, intermediate (where available), coach class, or special coach class for travelling soldiers. First class tickets will be valid for travel in coaches, and also in sleeping cars or parlour cars on payment of the normal extra charge for such accommodation.

Aid to Russia through Persia

Further information is now available regarding the lines of communication through Persia which are being established as a means of supplying aid to Russia. A description of the railways of Persia, and also of our eastern approach to Persia from the North West of India, through Baluchistan, appeared in our October 3 issue; and at page 512 of our November 14 issue we outlined some of the steps being taken to increase the facilities previously existing in Persia. It is understood that the Persian Government is assisting by waiving certain customs formalities and helping in the protection from raiding parties of the route from Duzdap (Zahidan), *via* Meshed, to the Soviet frontier; this route was indicated on the map at page 326 of our October 3 issue.

The work of the British Army in organising the despatch of war material to Russia through Persia is controlled by the Transportation Directorate, under Brig.-General Sir Godfrey Rhodes, which has been established in Teheran in the former offices of the German Steel Combine. Sir Godfrey Rhodes, who has been General Manager since 1929 of the Kenya & Uganda Railways & Harbours, is particularly well fitted by his experience for the heavy task he has undertaken. The functions of the Directorate of Transportation are to plan and supervise the development of road and rail communications, and particularly the very considerable enlargement which has been undertaken in the port of Bandar Shahpur. A special correspondent of *The Times* says that, when the British Army has finished with Bandar Shahpur, the Persians will have something to compensate them for the uninvited use to which their country is being put. The arrangement of corresponding facilities at the Caspian ports is being left to the Russians.

The organisation of road transport is in the hands of United Kingdom Commercial Corporation, which has chartered a fleet of nearly 1,000 lorries to transport goods to where the railways cannot carry them; it expects eventually to have something like three times that number. Officers of the Royal Engineers are preparing to supervise the maintenance of the thousands of miles of road which these lorries will use. This naturally involves the recruiting of some thousands of Persian labourers. The experiment is being made at the moment of discharging a smallish consignment of goods at the secondary port of Bushire and transporting it by road to the Caspian in order to test the capacity of this route to relieve the ports of Basra and Bandar Shahpur if they should become congested. No effort is being spared to make the transport system as extensive and elastic as possible.

It is an open secret that the task of the British authorities has been considerably eased as a result of the detailed knowledge readily given by representatives of important firms of British manufacturers who have had business connections with Persia during recent years. Thus, the additional requirements of the Persian railways were assessed rapidly, and steps promptly taken to secure the requisite equipment from various parts of the Allied and friendly world with standard-gauge railways. The U.S.A., and, to a smaller degree Canada and Australia, have been asked by Great Britain to provide the bulk of the rolling stock and steel rails needed to increase the carrying capacity of the Persian railways. The Australian Federal Government, in co-operation with the New South Wales Government, is sending 63 main-line locomotives and 835 railway wagons to Persia. This is no mean contribution, bearing in mind the comparatively limited stock of standard-gauge railway equipment on the Australian continent—a matter to which we made reference at page 484 of our November 7 issue. It is expected that Canada's main contribution will be in box cars, probably wooden because of a shortage of steel plate, with the U.S.A. supplying locomotives, rails, and more goods wagons. It is understood in Canada that Great Britain has requested in all 200 locomotives, 20,000 goods wagons, and 250,000 tons of steel rail.

The only other routes to Russia are by way of Murmansk or Archangel on the Arctic Ocean, or Vladivostok on the Pacific and the Trans-Siberian Railway. The Arctic route represents a haul of 5,500 miles from Canada or the United States, and the Trans-Siberian 10,600 miles.

In connection with the open goods wagons for the Middle East described in the November 21 issue of THE RAILWAY GAZETTE (page 530), we learn that the Great Western Railway supplied the following material: 1,300 brake levers; 500 three-link couplings; and 100 axle-box bearings.

Argentine Railway Workshops in Wartime

Measures planned before the war, or evolved since it began, have been put into force in the locomotive and carriage and wagon shops of some of the Argentine railways with a view to improving work methods and thereby obtaining the best results possible in conditions which adversely affect the flow of materials and create other difficulties. This has called for a great deal of improvisation in connection with the use of second-hand and scrap material in place of new, and has thrown a heavy strain on the already heavily taxed equipment in the workshops. On the Buenos Ayres Great Southern Railway at km. 10 on the main line, there is a large scrap dump where hundreds of tons of steel scrap in many forms have accumulated over a long period of years. With the restrictions on steel imports caused by war conditions, the value of this material has appreciated very considerably and has indeed attracted the attention of private firms, the result being the receipt by the Stores Superintendent of tempting offers for its purchase. Apart from the reclamation and re-use of materials actually declared scrap, the quest for economy in the use of new materials has been carried a stage further. In conjunction with the Stores Superintendent the Mechanical Department has made a determined effort to use up spare parts for rolling stock units which had either been scrapped or so modified that they were no longer required, thus conserving stocks of new materials and component parts. Where the parts can neither be adapted for use without modification nor used for other purposes by modifying them, they are returned to the foundry or smithy for use as raw material.

Congestion in the erecting shop at the Remedios de Escalada works of the Buenos Ayres Great Southern Railway has been relieved by the addition of two new shops and by a more systematic progressing of engines through the buildings, allowing of a half bay section being formed into a proper wheel shop, in connection with which an annexe for coupling and connecting rods is being planned. Coincident with the new layout of machine tools, individual drive is being introduced wherever possible, with a corresponding reduction in the amount of shafting and belting required. The importance of possessing a well-organised and equipped tool room is emphasised by the increasing difficulty of obtaining tools from abroad, as a result of the war, and measures have been taken to expand and improve this department. Other measures include a complete scheme for the provision of a lifting shop for carriage and wagon repairs, and during 1940 a beginning was made with the systematic repairing of certain classes of bogies at fixed points.

In the diesel section also there has been some reorganisation and re-equipment and the railcar shop has been laid out on a definite progressive basis. The R. de Escalada shops are the largest railway works in South America and there are other B.A.G.S. works at Bahia Blanca, where a modified layout of the wagon repair yard has been undertaken, and as a result the elimination of two bottle necks which formerly caused the actual repair operations to be held up by shunting operations has been made possible. The installation of the new track system was completed in May, 1940, and this enabled a beginning to be made with the gradual re-organisation of the work; the first step was the initiation of a belt system of repairs to certain classes of vehicles.

At the Liniers workshops of the Buenos Ayres Western Railway, which are the only shops of the company, there has been carried out since the outbreak of war a system of reconditioning of used materials for the Way & Works department and the improvisation of scrap materials in the manufacture of spares for that department. The state of affairs previously existing caused Liniers to be used for all kinds of " odd jobs " and much ingenuity was shown in devising means for executing such jobs with a maximum of economy. The measures introduced in 1940 are having a marked effect in facilitating and expediting rolling stock repairs there.

The foregoing is abstracted from a paper read by Mr. D. S. Purdom at a meeting of the South American Centre of the Institution of Locomotive Engineers under the title of " Argentine Railway Workshops in Wartime." The paper was comprehensive, covering in detail many of the works operations in the different shops, some of which, as the author pointed out, were in use prior to the war. A lengthy discussion followed the reading of the paper.

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Ministry of War Transport Accident Report

Holmes Chapel, L.M.S.R., September 14, 1941

Colonel A. C. Trench inquired into the causes of the accident which occurred at 1.23 a.m. on September 14, 1941, at Holmes Chapel, on the Crewe to Manchester line of the L.M.S.R., when the 12.35 a.m. passenger train, Crewe to Leeds, consisting of a 4-wheel goods van followed by 6 eight-wheel bogie coaches (the last an all-steel vehicle), drawn by 4-6-0 tender engine No. 5514, having just started from the home signal at Holmes Chapel station and attained a speed of about 5 m.p.h., was overtaken by the 12.50 a.m. passenger train, Crewe to Manchester, composed of 9 eight-wheel bogie coaches (the first and fourth all-steel vehicles), drawn by 2-6-4 tank engine No. 2395, running at about 30 to 35 m.p.h. while reducing speed for a 25 m.p.h. engineering restriction; this train had been admitted to the block section by mistake and the driver had seen the distant signal for Holmes Chapel at clear. Four vehicles in each train had special shock-absorbing buffers. The last vehicle (described in the report as a "brake coach" and of all-steel construction) of the Leeds train was telescoped and demolished by the engine of the colliding train, which fell over almost on its side, the driver and fireman escaping with trifling injuries, while the roof of the coach ahead was torn off and its body broken away from the underframe; 40 ft. of the coach next ahead was smashed and the coach thrown across the tracks. Six passengers, one a goods guard, were killed, and three fatally injured; 45 were injured.

The Origin of the Collision

The four signal boxes concerned were Sandbach, Bradwall, Holmes Chapel and Goostrey; the error in block working occurred between the second and third. Bradwall intermediate block post is opened only for the night shift, to deal with heavy goods traffic, and has but 4 levers, working distant and home signals for each direction, with the block instruments of old L.N.W.R. 3-position type, on a shelf at one end and not over the levers.

Driver Walsh, of the Leeds train, found Holmes Chapel distant at caution and stopped at the home signal at about 1.20 a.m. A train so standing is not noticeable from the box, owing to an overbridge, unless deliberately looked for. Fireman Stoddard proceeded to the box, the whistle having been sounded, but before he got there he saw the starting and advanced starting signals pulled off. He proceeded to the box, however, and said that Signalman Perks seemed rather surprised to see him and asked "What are you?" On being informed, he replied, "I thought you were the 12.50." Walsh moved slowly forward when the home signal was pulled off and had reached about the middle of the platform when the collision occurred. Driver Hall, of the Manchester train, found Holmes Chapel distant at clear, but began to slow down for the speed restriction. He did not see the tail lamp, which was on the off side of the train ahead, from his left-hand driving position, nor did his fireman, who had become temporarily dazzled after firing.

Signalman Fellows at Sandbach had both trains duly accepted by Signalman Miller at Bradwall and given as out of section at 1.14 and 1.22 a.m. respectively. According to his own block register, Miller got the Leeds train accepted from Holmes Chapel at 1.11 a.m., when he had "entering section" from Sandbach, and gave that signal in turn for it when it passed him at 1.14 a.m. He had "train out of section" recorded for it as being received at 1.16 a.m. but the latter figure had, however, been inserted after erasure of another. The only bookings he had for the Manchester train were his acceptance of it at 1.14 a.m. and "line clear" received for it at 1.16 a.m. from Holmes Chapel. He originally stated that he was "under the impression" that he had received "train out of section" for the Leeds train, but told Colonel Trench that he was certain he had received that signal, but did not see whether the block instrument had gone back to "line blocked." He was confident that he had offered and obtained acceptance for the Manchester train and, shortly after, suddenly saw the block instrument was at "line clear" and his down signal levers normal. He got up from his seat and pulled them over. The train passed and he gave "entering section," but the needle not being altered, had to give it a second time.

Signalman Perks, Holmes Chapel, said he received "Is line clear?" at 1.9 a.m. and "entering section" not till 1.21 a.m., when he then obtained acceptance from Goostrey, the usual practice at his box. He had not realised the lapse of time between the two signals, being occupied with making tea and getting supper from his bicycle below the box. While there he heard "entering section" sound and it was repeated before he got back upstairs, no doubt because he had not at once altered the block indication. He was quite clear that he had no other signals for the down line from Miller but the two mentioned, between 1.9 and 1.21 a.m. He had no idea a train was at his down home signal and was surprised, after pulling off all the down signals, to see Fireman Stoddard of that train enter the box. He could not say whether he had or had not said "I thought you were the 12.50," and could not suggest why he might have done so. He later agreed with Hall and his fireman that the distant had been off when they passed it. After he had given "obstruction danger" he rang up Miller and said, "What is this; there are two of them here," but neither Perks nor Miller could recollect what reply was given.

Inspecting Officer's Conclusions

The Inspecting Officer concludes that responsibility for this accident is attributable to Miller, or to Perks, or both. Miller maintained that he had seen the tail lamp of the Leeds train, sent "entering section," and received "out of section" for it, and had the Manchester train accepted. He could not remember the block indicator going to "train on line" or being restored to normal for the former train, but he maintained that he restored his signals behind it and pulled them off again for the Manchester train, on seeing the block indicator at "line clear." He admitted being much interested in a book he was reading, but as far as his duties were concerned thought everything was in order. Perks, on the other hand, was confident that he did not receive "entering section" until 1.21 a.m., and that it was then given twice, as above related. During the period concerned, an up train was dealt with which passed Bradwall at 1.11 a.m.

Colonel Trench considered the alternative probabilities of failure on the part of the two men. If Miller failed to send "entering section" for the Leeds train before giving "out of section" for it, his absorption in a book might make him forget to send it later; he would probably take no action until receiving "entering section" for the second train, when, seeing the block indicator for the section in advance at "line clear," he would pull off his signals, if he had ever replaced them, and give "entering section" for that train in due course. If, however, he had sent that signal for the first train and Perks had failed to acknowledge it, Miller was not likely to have failed to send it again, as indeed he did for the Manchester train, for that reason. If Perks did correctly take "train on line" for the first train, he must have put the block indicator back

The overturned engine, and the remains of the steel van (the last vehicle of the train into which it ran) being removed by crane

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to normal without anything passing him, and failed to offer the train to Goostrey. Despite the reminder of the block indicator he must have forgotten all about the Leeds train, and deliberately, for no reason, cancelled that reminder, an unlikely combination of failures. Colonel Trench concludes that Miller failed to send "entering section" for the first train and that the main responsibility rests on him. This opinion is confirmed by the erasure in his block register, and serious discrepancies discovered among other entries on earlier days taken at random, as if he had been in the habit of making them later, relying largely on memory and guesswork. The locker on which he was sitting reading was within hand reach of the block instruments, and he may probably have been sending and receiving bell signals mechanically without thought and without getting up. He is 31 years of age, has spent 3 years as signalman, 2½ of them in Bradwall box, with a clear record.

Colonel Trench is unable to understand the alleged remark of Perks to Stoddard, "I thought you were the 12.50," but on full consideration does not think the primary blame for the mistake in signalling rests with him. But, with two block sections in rear, each only 1½ miles long, and having accepted an express, he might have been expected to inquire about it before a lapse of 12 min., and should not have left the box, even for a brief period, without doing so. He probably went below the box earlier and stayed longer than he thought, as he returned, took "train on line" and pulled off before Stoddard reached him, which was before the collision. He could hardly be expected to notice the engine head lamp unless he had looked for it. He is 31, and has spent 15 years with the company, 8 as signalman.

There is no reason to doubt that Stoddard went to the box without delay, and Driver Hall cannot reasonably be blamed for failure to see the tail light. There was a slight right-hand curvature, he had clear signals and was occupied with observing the speed restriction.

Recommendations and Remarks

Miller had been working a night turn in an intermediate block post, with work of the most monotonous type, for over two years, in conditions making any satisfactory supervision difficult. Colonel Trench considers it undesirable that a man should be employed permanently on such monotonous, albeit responsible, night duty, and particularly in the case of a young man of such comparatively short railway service—Miller had been only 4 years with the company—that he cannot have become imbued with the spirit of responsibility and faithful performance of duties, often monotonous, which characterises the majority of signalmen and others with longer service. These considerations are commended to the attention of the company.

The Inspecting Officer remarks that certain safety devices might have prevented this accident, varying from simple block and signal interlocking to the company's class "C" block, with track circuits. Such were being installed extensively before the war, and are still, as labour and materials permit. The company has, however, adopted an order of priority, determined by circumstances, precedence being given, for instance, to 4-track main lines, junctions, and other places of special pressure on the signalman. Sandbach Junction has been provided with such equipment. In Colonel Trench's opinion, there do not appear to be special conditions at Holmes Chapel to justify priority, and the policy of treating the most difficult places first is undoubtedly correct.

Questions in Parliament

Winter Passenger Services

The railways are working under heavy pressure due mainly to two factors—the increasing production of munitions and of coal, and the fact that a substantial number of locomotives have been sent abroad to assist Russia. Essential freight traffic must have the transport it needs. It is, therefore, necessary to reduce passenger services, not only through the Christmas period, but throughout the winter months. A further number of long distance passenger trains with restaurant cars on congested routes, and a substantial number of sleeping cars are to be withdrawn. There will be no alteration in the rules already in force as to the use of first class accommodation by third class passengers if third class accommodation is overcrowded. A certain number of sleepers will be reserved for Government officials and also a certain number for Members of Parliament. (Colonel J. J. Llewellin, Parliamentary Secretary, Ministry of War Transport, November 26.)

Amplifiers on Underground Stations

Consideration is being given to the introduction of amplifiers at certain important surface stations on the underground system; the matter is in the hands of the London Passenger Transport Board. There is difficulty in the manufacture of these articles in view of the need for providing for the requirements of aircraft and other war necessities. (Colonel Llewellin, November 26.)

Nigerian Railway Workers

The numbers of railway employees injured and killed on the Nigerian Railway during the financial years ended March 31, 1939, 1940, and 1941, were as follow: 1938-39—Total cases 13, of which 5 were fatal, and 3 resulted in permanent disablement. No compensation has been paid in respect of the fatal cases; 1939-40—Total cases 10, of which 2 were fatal and 3 resulted in permanent disablement. Compensation has been paid in respect of one fatal case. 1940-41—Total cases 12, of which 5 were fatal and 1 resulted in permanent disablement. Compensation has been paid in respect of one fatal case. In the 12 fatal cases, 7 of the men were run over by trains, one fell from a train in motion, one was burnt and three were the result of misadventure. Compensation has been paid in respect of all the cases of permanent disability resulting in discharge from employment, but where the injured party continued in the railway service, the award of compensation has been deferred for consideration of an appropriate addition to the service gratuity payable on eventual retirement. Although the Workmen's Compensation Ordinance is not yet operative, its provisions have, since publication in May last, been adopted by the Nigerian Government and all questions of compensation for injury or death of railway servants are now dealt with in accordance with those provisions. Steps are being taken to obtain corresponding figures for the year 1937-38 and particulars of the amounts paid in compensation for the four years referred to. The Secretary of State for the Colonies is communicating with the Governor as to those cases where no compensation has been paid. (Mr. George Hall, Under Secretary of State for the Colonies, November 26.)

Trade Union Recognition

The Nigeria Railway is a Government undertaking and the Nigeria Trade Unions Ordinance of 1939 provides for the compulsory registration of trade unions. Several unions of railway workers have already been registered under the Ordinance and thereby accorded Government recognition. One of these is the Railway Workers' Union, whose membership in August, 1940, was over 2,000 persons, and certain proposals for revised conditions of pay made by the railway management were recently discussed with the representatives of this body and another union. (Mr. George Hall, November 26.)

Christmas Travel

With certain exceptions, of which commands have been informed, leave involving travel by rail during the period between December 24 and 28 will not be granted to Royal Air Force personnel. (Captain Harold Balfour, Joint Under Secretary of State for Air, November 27.)

Men serving in the Navy will not normally be allowed to travel on leave by rail between December 24 and 28, unless they are going on leave from seagoing ships, or on compassionate leave. (Sir Victor Warrender, Parliamentary Secretary to the Admiralty, November 27.)

Post-War Operating Problems

At an informal luncheon meeting of the Institute of Transport on November 25 at the Institution of Electrical Engineers, W.C.2, Mr. Charles F. Klapper opened a discussion on "Operating Problems after the War."

Mr. Klapper said that after the destruction of assets in war there would obviously have to be a period of Government control of commodities and services in short supply. The number of private cars might be reduced, causing crowding of public facilities at holiday periods; alternatively technical progress in the motorcar industry, as a result of the war, might lower the proportionate cost so that motoring would flourish. He suggested, as a profitable avenue of research, for the railways especially, the possibility of providing a service competitive with the private car. He gave a number of examples to show the need of 50 m.p.h. bookings on cross-country routes, where at present the motorcoach is often as fast as a train, and the need for closer headway extra high-speed services on main lines. He also dealt with the effect of redistribution of population on suburban train operation, and with the possible need of improved outer suburban services, and spoke of the adaptability of steam push-and-pull nine-car sets such as the Paris suburban equipment on the Northern Railway of France, with 30 m.p.h. in 30 sec. acceleration behind 2-8-2 tank engines.

A permanent value might attach to the Hauliers' National Traffic Pool section of the Ministry of War Transport Road Haulage Branch as a comprehensive clearing house, and he thought that the value of the Road & Rail Central Conference in establishing acceptable rates could not be ignored. In answer to the question as to whether road vehicle loads or the vehicles themselves could be conveyed satisfactorily by rail over the trunk portions of their journeys, Mr. Klapper gave a description of some possible variations for such a scheme. Among other points which were dealt with by Mr. Klapper were railhead distribution, producer gas as a motive power in peacetime, the influence of the war on lorry and bus design and dimensions, and developments in bus and coach operation.

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RAILWAY AND OTHER MEETINGS

The Bombay, Baroda & Central India Railway Company

Two extra-ordinary general meetings of the Bombay, Baroda & Central India Railway Company were held at "Guildcroft," Epsom Road, Guildford, Surrey, on November 24. Major A. D. G. Shelley, R.E., Chairman of the company, presided.

The first meeting had been called to consider a resolution put forward at the request of Colonel Pigott and other stockholders, to the effect that the sum of £5,000 out of the balance standing to the credit of the stockholders' revenue account should be paid by way of additional remuneration to the directors in recognition of past services and divided as they might decide.

The Secretary, Mr. N. Lincoln, having read the notice convening the meeting,

The Chairman said that before proceeding with the business of the meeting he wished to express the deep regret of his colleagues and himself at the death of Mr. A. R. Barrand, who had been a director for 16 years, and who had retired from the board when the offices of the company had been moved to Guildford. He also expressed his regret at the death of Sir Ernest Jackson, who had served the company as Chief Auditor and afterwards Agent for 20 years.

Turning to the business on the agenda, the Chairman said that intimation had been received from some stockholders of their wish for the resolution to be put forward. The board had learned, however, that the proposal did not meet with the approval of some other stockholders and therefore the directors would prefer for it not to be put to the meeting.

Resolution Not Put

Colonel Pigott agreed, with the consent of the meeting, not to put the resolution, but said that he did so with great regret. He thought some stockholders failed to appreciate the fact that they were indebted to the board for the steady dividends of 6 per cent. they had received for 20 years and for the strong reserve position which had been built up and which would benefit stockholders when the company was wound up. It was a source of gratification that a concern in every way in good working order would be handed over to the Government of India next year.

The second meeting was for the purpose of considering the provisions of the Bill now being promoted in Parliament for the winding up and dissolution of the Bombay, Baroda & Central India Railway Company and for giving effect to arrangements made with the Governor-General of India in Council.

The Secretary having read the notice convening the meeting,

The Chairman said that the company's Solicitor, Mr. G. Pritchard, would explain the principal provisions of the Bill.

Mr. G. Pritchard said that the earlier clauses of the Bill were historical and dealt with the statutes which governed the company, and with its contracts with the Government of India. The Bill also took cognisance of the fact that the Governor-General in Council had given notice, expiring on December 31, 1941, of termination of the contracts with the company. Therefore on January 1 next the company would be in the position that, as it had been incorporated to carry out certain contracts and the contracts had come to an end it could no longer function. It could not even wind itself up, because, being incorporated by a Special Act of Parliament, the company could not be wound up under the Companies' Act; nor was the company abandoning a part of its undertaking, which would have brought it within the scope of other procedure. There was no way of winding the company up except that provided for in the Bill now under consideration. That would allow the directors, who knew all about the company, to wind it up in the best and most economical way.

Functions after January 1, 1942

The Bill provided that from January 1, 1942, the company would continue only for the purpose of winding itself up. After three months from the distribution of the assets the amounts standing to the credit of the unpaid interest and dividend account, and unpaid debenture stock interest account, would be transferred to and vested in the Governor-General in Council. That was so that anyone who had a claim on these accounts would have someone to go to about it. The company's Provident Fund would be in the Governor-General's possession and all the company's liabilities and obligations under it would come to an end. All contracts with the Government would be terminated except for certain provisions regarding debenture stock and other matters. The debenture stockholders were not going to lose their security, but would have the Governor-General liable to them.

The Chairman and directors would continue in office to wind up the company and would get £5,000 as their remuneration, no matter how long the process of winding-up lasted.

The manner and order in which the assets of the company were to be distributed were defined in the Bill. Any assets remaining after meeting all debts and liabilities would be available for dividends. The directors were, however, empowered to retain £1,000 to meet unforeseen contingencies. The Government of India would take over any unclaimed dividends and interest, thus releasing the company from liability and also providing a body on which a claim could be made. When the whole of the company's property had been realised and distributed, the directors would pass a resolution declaring the company to be wound up and notice of that would be published in *The London Gazette*.

The Chairman then moved: "That the Bill now being promoted in Parliament intituled 'A Bill for the winding up and dissolution of the Bombay, Baroda & Central India Railway Company and for giving effect to arrangements made with the Governor-General of India in Council' now submitted to this meeting be and the same is hereby approved subject to such additions alterations and variations as Parliament may think fit to make therein and as the board of directors may approve."

Colonel W. V. Constable (Deputy Chairman) seconded the proposal, which was carried unanimously.

The Chairman continued: "Before this meeting is closed I should like to make a few remarks for the information of the stockholders as to the procedure which it is proposed to follow as to the winding up of the company and the distribution of its assets. On the evening of December 10 next the transfer books of the capital stock will be closed and they will not be reopened. All payments thereafter in respect of the stock will be made to the holders who are registered on the company's books on that date. The final payment of guaranteed interest, namely, for the half-year ending December 31, 1941, will be made on January 6, 1942, and an interim payment in respect of surplus profits for the final nine months, that is, up to December 31, 1941, will be made at the same time.

"The board is advised that no further distribution can be made until the Bill has received the Royal Assent. The first distribution will be an amount equivalent to the holdings of the capital stock at par, and it will be made as soon as possible after the passing of the Act; probably early in March. A further distribution will be made when the surplus profits due to the company for the working of the railway for the final nine months ending December 31, 1941, have been ascertained and received, and the company's other assets realised.

"Early in January next each stockholder will be asked to give instructions as to the payments due in respect of his holding on the winding up and he will, at the same time, be asked to forward the certificate of his holding to the company's office for cancellation."

Colonel Pigott moved, and Mr. F. C. Atkins (representing the Prudential Assurance Company) seconded, a vote of thanks to the Chairman and directors. The resolution was carried unanimously and after the Chairman had briefly expressed his thanks the proceedings terminated.

LONDON TRANSPORT IN FILMS.—At the Albert Stanley Institute, Hammersmith, W., on November 25 employees of the London Passenger Transport Board were shown a representative selection of recent films in which the activities of London Transport are depicted and in the making of which London Transport has co-operated by providing facilities. The films included some made by the Ministry of Information, the British Council, Crown Films (formerly the G.P.O. Film Unit), British Paramount News, Pathé Pictures, Strand Films, Spectator Films, and Pinebrook Limited. Two short sections of film showed women bus conductors in training, and women workers at Chiswick. A film called "City Bound," which is to be shown overseas as part of the council's propaganda to inform foreigners of the way English people live and work, embodied scenes from a train on a journey from the country to town. Another film, "Christmas under Fire" made for the Ministry of Information by Crown Films, was designed primarily for exhibition in the United States and contains scenes of shelterers in London tube stations. "Lightning Conductor," featuring Gordon Harker as a bus conductor, gave a good impression of the board's welfare work and the general good fellowship of the staff.

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Notes and News

Agreed Charges.—Forty-six applications for the approval of agreed charges under Section 37 of the Road & Rail Traffic Act, 1933, have been lodged with the Railway Rates Tribunal. Notices of objection must be filed on or before December 6.

Burnyeat Brown & Co. Ltd.—The Order of the High Court of Justice Chancery Division, dated November 3, 1941, confirming the reduction of the capital of this company from £420,000 to £276,000, was registered with the Registrar of Companies on November 17.

German Motor Sales in Brazil.—Drastic reductions during 1940 were shown by the figures of German sales of motor vehicles and engines to Brazil. As compared with 1939 the drop was 95 per cent., the 1940 value being 795,459 milreis ($48,210) against 15,493,054 milreis ($938,970) in 1939.

L.N.E.R. Hotel Fire at Aberdeen.—Among principal fire losses of which estimated figures are given in *The Times* appears that of the Palace Hotel, Aberdeen, which figures at £95,000. The fire occurred early on October 30. As was recorded in THE RAILWAY GAZETTE of November 7, six persons lost their lives in this fire. The hotel is now closed.

N.W.R. Oil-Burning Locomotives.—By a slip, the note on the history of oil-burning locomotives published at p. 518 of our November 21 issue, referred to the conversion "to" oil-burning of the Decapods running on the N.W.R. (India); actually, the recent conversions were "from" oil-burning to coal burning, as recorded in THE RAILWAY GAZETTE of October 3 (p. 322).

Derailment in Northern Ireland.—About 20 wagons were wrecked in the derailment of a heavily-laden goods train at Lissue, 2 miles from Lisburn, County Antrim, on the G.N.R. single-line branch to Newcastle on November 25. The track was torn up for several hundred yards. The wagons piled themselves high into the air and one fell into a river. The train was laden with potatoes, grass-seed and building material.

Great Southern Railways (Eire).—For the 46th week of 1941 the Great Southern Railways Company reports passenger receipts of £33,229 (against £29,094), and goods receipts of £77,637 (against £64,688), making a total of £110,866, against £93,782 for the corresponding period of the previous year. The aggregate receipts to date are passenger £1,834,730 (against £1,626,313), goods £2,508,973 (against £2,228,457), making a total of £4,343,703 (against £3,854,770).

American Transport Research Board.—The Board of Investigation and Research established under the Transportation Act of 1940 has made its first report to the President and Congress. Preliminary activities of the board included its plan to seek the co-operation of all private and governmental agencies interested in transport, with the intention to avoid unnecessary and wasteful duplication of effort by utilising to the greatest possible extent materials and personnnel which may already be available. The board has already received valuable assistance from other departments in connection with its initial problems of organisation. It appears, however, that, because of changed conditions since the legislation of 1940 less can now be accomplished through the staffs and facilities of other governmental agencies than was originally estimated.

U.S. Revenue Freight Loadings.—Statistics issued by the American Railway Institute show that loadings of revenue freight for the week ended November 15 totalled 883,800 wagons. This represents an increase of 10,200 wagons on last week and of 138,500 on the same week last year.

Further Railway Equipment for Newfoundland.—Some 50 new flat wagons and 50 new tank cars arrived in Newfoundland from the United States at the end of August and are now being assembled. Several new locomotives are expected to arrive shortly, and eventually a number of passenger and other types of carriages. When these are placed in service it may be possible to inaugurate a daily express service between St. John's and Port-aux-Basques.

THE BUS TICKET AND THE WAR EFFORT

A bus ticket is good for a ride. It is also good for making cartridge cases, and 7,000,000 tickets a day will make a lot of cartridge cases.

So London Transport has placed a contract with a salvage firm, and many tons of waste material swept from the floors of London's buses, trolleybuses, and trams will be put to use.

This flotsam and jetsam will be screened to eliminate hairpins, matchsticks, cigarette ends, and string—"contraries" as they are called in the paper trade—and the remaining paper will go to help the war effort.

So do not throw your bus or tram ticket on the floor. Put it into the ticket box as you leave and thus save labour. A few vehicles have not got ticket boxes, but they soon will have them.

Eight Months' U.S. Railway Accidents.—A preliminary summary by the Interstate Commerce Commission of steam railway accidents in the United States during the first eight months of 1941, gives the number of train accidents as 5,795, compared with 4,520 for the first eight months of 1940. In train accidents (causing damage of more than $150 to railway property) 4 persons, against 66, were killed, and 714, against 640, were injured. Level crossing accidents for all classes of persons caused 1,152 deaths (against 1,105), and injuries to 2,849 (against 2,659). The number of employees killed on duty was 447, compared with 336, and those injured on duty were 15,617, against 11,592.

Institute of Transport Examinations.—The graduateship and associate membership examinations are to be held in London and at other centres on May 4, 5, and 6, 1942; the latest date for the deposit of entry forms is March 31. (January 1 if any exemptions are claimed.) The examinations will be held in the order shown on a timetable which will be sent to each candidate together with an admission card and an intimation of the place of examination. A list of candidates who have passed both parts of the graduateship and associate membership examinations arranged in three classes of merit, and of the candidates who have passed in one part only will be issued to each candidate. Persons who have passed the graduateship or Associate membership examination may apply to enter again for the examination in one or more of certain subjects not taken in the original entry. Full details may be obtained from the Acting Secretary, Mr. F. W. Crews, 15, Savoy Street, W.C.2.

Threatened U.S. Railway Strike Settled.—A settlement of the threatened railway strike was announced on December 1 by Mr. W. L. Morse, Chairman of President Roosevelt's fact-finding board. The terms were not disclosed.

Collision in Lancashire, L.M.S.R.—On November 22 a collision occurred between Castleton and Heywood, L.M.S.R. when a Rochdale to Blackpool train ran into one from Manchester to Bacup. A guard was killed, and several passengers were slightly injured.

Export Control.—The Board of Trade has made the Export of Goods (Control) (No. 41) Order, 1941 (S.R. & O., 1941, No. 1886, price 1d.) which came into force on December 1. This Order makes it clear that the requirement of an export licence for the export of iron and steel castings, forgings, stampings, and pressings does not extend to such machinery parts as are not covered by other headings in the Export Control List.

Canadian National Railways.—Gross earnings during October last were $28,760,510, an increase of $5,775,531, and operating expenses were $22,721,781, an advance of $4,978,124, leaving net earnings $797,407 higher, at $6,038,729. Aggregate gross earnings for the ten months from January 1 are $249,072,521, an increase of $47,671,551, and the net earnings of $54,628,055 show an improvement of $21,418,417.

Tanganyika Concessions Limited.—Presiding at the ordinary general meeting of this company on November 27, General Sir F. Reginald Wingate said it was reported that operations at the mines and works of the Union Minière Company in Katanga continued to be carried on satisfactorily. That company had, of course, no difficulty in disposing of its products. As the Benguela Company, it was satisfactory to note that, despite the restriction of business owing to war conditions, the results of 1940 showed an improvement.

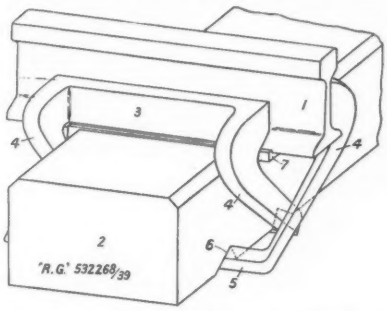
United States October Railway Earnings.—The following figures of October gross and net earnings of four American railways are given by Reuters:—Union Pacific, gross $22,989,000, increase $5,372,000; net $3,183,000, increase $126,000. Chesapeake & Ohio, gross $15,498,000, increase $4,533,000; net $7,756,000, increase $4,596,000. Kansas City & Southern, gross $2,016,000, increase $666,000; net $352,000, decrease $24,000. Southern Pacific Railroad, gross $29,847,000, increase $7,175,000; net $7,663,000, increase $2,396,000.

ABSTRACTS OF RECENT PATENTS*

No. 532,268. Securing Rails

Maurus Banyai, of 5, Hill Street, Broughty Ferry, Angus, Scotland. (*Application date: August 22, 1939.*)

According to this invention the rail 1 is secured to sleeper 2 by a clamping device. This clamping device has two pivoted jaws 3 including an upper bar, side arms 4, and lower bars 5. The arrangement is such

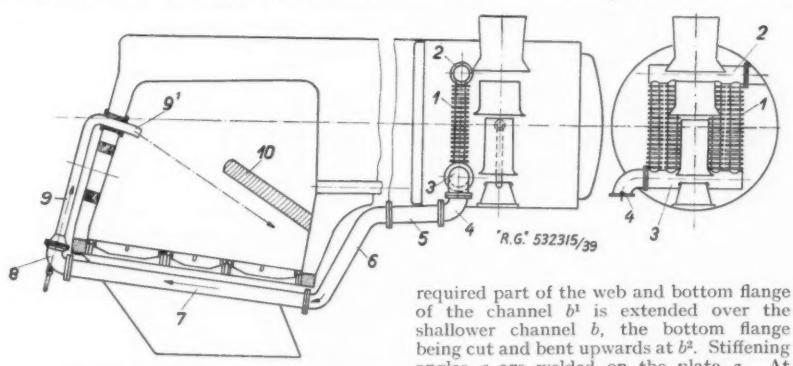


that the arms 4 straddle the sleeper 2 and the bars 5 engage notches 6 in the underside of the sleeper. Wedge means 7, for locking the jaws 3 against the rail 1, are introduced between the base of the rail and the upper surface of the sleeper 2, the wedge 7 being seated in a recess in the sleeper. The cross-section of the bars 5 may be of any desired form, such as circular, or polygonal, the notches 6 in the sleeper 2 being of corresponding shape. In a modification the bars 5 are arranged to penetrate transverse holes in the sleeper 2 instead of engaging the notches 6.—(*Accepted January 21, 1941.*)

No. 532,315. Smokeless Fuel Combustion

Stefan Wikarski, of 16, Hoza Street, Warsaw, Poland. (*Application date: July 15, 1939.*)

In order to provide smokeless combustion in a locomotive furnace, secondary air is pre-heated in a heater situated in the smoke-box between the spark-arresting netting and the axis of the smoke-stack. Air is drawn

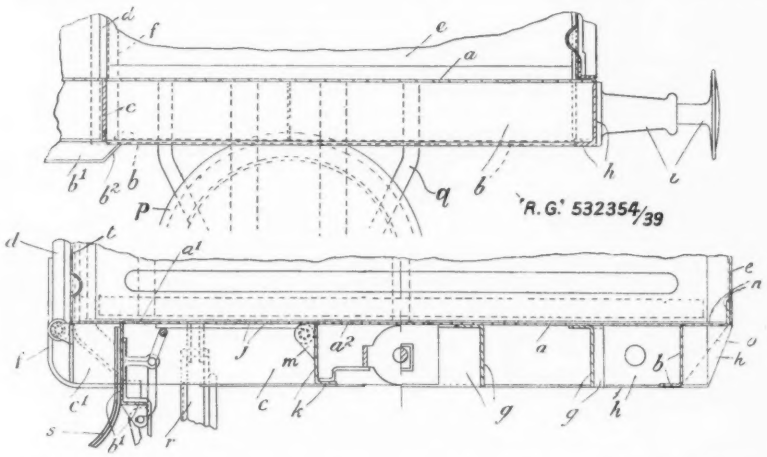


from outside the smoke-box into tube 2, through ribbed heating tubes 1, and out through tube 3 and elbow 4 into tube 5. From thence the secondary air passes through tube 6 to tube 7 under the fire-grate. Tube 7 is thickly covered with asbestos and is connected to blowers 8 which force the air through tube 9 and outlet 9^1 into the fire-box below the arch 10. The device is so arranged that pre-heated air enters the fire-box each time a new layer of fuel is being fired and when the boiler blower is set in operation simultaneously with closing of the throttle. The ratio of the quantity of steam admitted to the boiler blower to that admitted to the air blowers 8 depends on the quality of the fuel being used.—(*Accepted January 22, 1941.*)

No. 532,354. Wagons

The Butterley Co. Ltd. and James Leslie Hogg, all of Butterley, Derbyshire. (*Application date: August 26, 1939.*)

In a railway wagon the side edges of the bottom plate *a* of the wagon body are bent over downwards and the bottom edges of

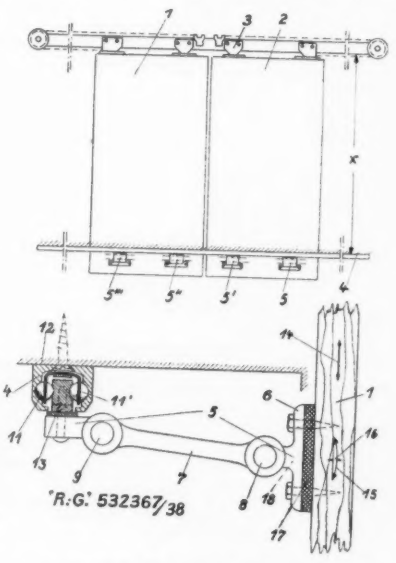


the downwardly bent portions are bent inwards to form a channel *b*, which substitutes the usual separate rolled section framing members. Cross-plates *c* extend beyond the channels *b*, and the ends c^1 are welded to the vertical stanchions *d* of the sides *e*, stiffening pieces *f* being welded to both. Where deeper channels b^1 are required part of the web and bottom flange of the channel b^1 is extended over the shallower channel *b*, the bottom flange being cut and bent upwards at b^2. Stiffening angles *g* are welded on the plate *a*. At each end a headstock *h* is secured and fitted with buffers *i*. When bottom doors *j* are fitted the bottom plate *a* is in three separate portions laterally, the centre portion a^2 being bent to form channels *k* which carry the door hinge brackets *m*. A bent plate *n* is welded to the plate *a* and bolted to the side *e*, and stiffener gussets *o* are welded to the channels *b*, b^1, and to this plate *n*. The wheels *p*, axle guards *q*, brake mechanism *r*, buffing springs *s* and side doors *t* may be of standard form.—(*Accepted January 22, 1941.*)

No. 532,367. Sliding Doors

Vereinigte Baubeschlag-Fabriken Gretsch & Co. G.m.b.H., of Stuttgart-Feuerbach, Germany. (*Convention date: August 29, 1938.*)

In order to compensate for the variation in the distance X between the upper and lower guiding means for sliding doors of vehicles, jointed arms 5, 5′, 5″ and 5‴ are provided on the panels 1 and 2. For instance, of a two-leaf sliding door, which panels are moved correspondingly by means of cable or chain connecting the fittings 3. The panels 1 and 2 are guided in bottom guides 4. Each panel carries a bracket 6 connected to an arm 7 by a joint 8. A further joint 9 connects the arm 7 to a sliding member 13 which slides in the track between



balls 11 and 11^1 in the bottom guides 4. These guides consist of a fixed supporting rail 12. The balls 11 and 11^1 run between the two rails 12 and 13. Movement of the panels along the direction of arrows 14 is compensated by the jointed arm 5, and the

* These abridgments of recently published specifications are specially compiled for THE RAILWAY GAZETTE by permission of the Controller of His Majesty's Stationery Office. Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet as issued, on payment of a subscription of 5s. a group volume, or in bound volumes, price 2s. each, and the full specifications can be obtained from the same address price 1s.

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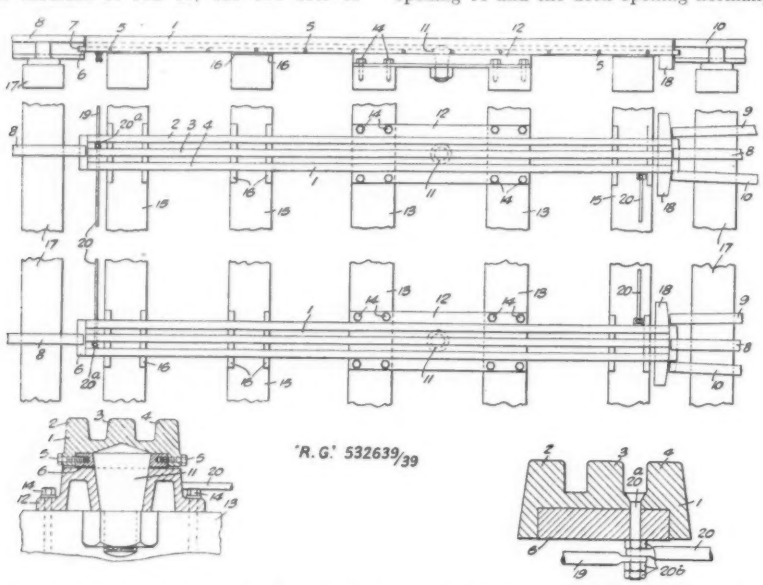
circular motion along arrows 15 and 16 is compensated by placing an elastic base 17 between the panel and the base 18 of bracket 6.—(*Accepted January* 22, 1941.)

No. 532,639. Turn-out.

Timothy Taylor, of Vaal-Hartz Irrigation Works, P.O. Andalusia, Transvaal, South Africa. (*Application date: September* 18, 1939.)

A turn-out or switch consists of two sets 1 of turn-out rails 2, 3, 4 secured by studs 5 to plates 6 which fit easily in the cut-away portions 7 of the main line and branch rails 8, 9, 10. The turn-out rail sets 1 are pivoted on bolts 11 mounted on a steel sleeper 12 secured to two transverse sleepers 13 by screws 14. Transverse sleepers 15 support the remainder of the assembly, and these sleepers are provided with bearing strips 16. In order to secure the sleepers 13 and 15, longitudinal rails (not shown) may be connected to these sleepers and to the sleepers 17 supporting the fixed rails 8, 9, 10. Balance weights 18 are provided to bring the centre of gravity of the turn-out rail sets 1 to the pivot bolts 11. Operation may be by hand through the medium of rod 19, the two sets of



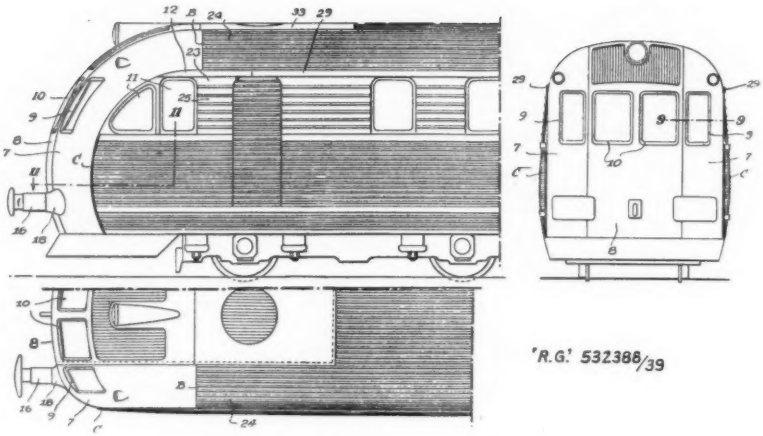
'R.G.' 532639/39

turn-out rails 1 being joined by rods 20 which are secured to the plates 6 by bolts 20*a* and nuts 20*b*. The turn-out rails 2, 3, 4 of each set 1 may be formed as a unit, by rolling in one section.—(*Accepted January* 28, 1941.)

No. 532,388. Carriage Bodies.

Edward G. Budd Manufacturing Company, of 2500, *Hunting Park Avenue, Philadelphia, Pennsylvania, United States of America.* (*Convention date: June* 12, 1939.)

A carriage body particularly for a stainless steel carriage consists of side covering panels 7 and a central panel 8 which are contoured and very rigid. Window frames 9 and 10 are mounted in these panels. Joints between the body and the side and deck assemblies are lapped joints, at *B* and *C*. Lapped joints are also installed between the collision beams and the deck sills, and between the front posts, which curve around the tops of the windows 11, and the roof girder. The upper end of the front posts 5 are connected to the roof girder by a gusset 23, the upper part of which is masked by the sheet 24 of the deck, and the lower part of which is connected to the panel 25. Moulding 29 masks the joint



'R.G.' 532388/39

between two upright members to which panel 25 is attached. Further moulding 12 acts as reinforcement. Joint *B* is made by welding through the window opening 11 and the deck opening normally closed by a detachable door 33. Each buffer 16 passes through a large clearance hole in the panel 7, the hole being masked by fairing 18.—(*Accepted January* 23, 1941.)

COMPLETE SPECIFICATIONS ACCEPTED

532,089. Matthews, G., and Crossley Motors Limited. Electric lighting systems for electrically-propelled vehicles.

532,096. Seimens & General Electric Railway Signal Co. Ltd., Austin, T., and Mott, J. E. Automatic train-control systems.

532,206. Mooney, D. E. Lubricators for railway-vehicle axles.

532,252. Westinghouse Brake & Signal Co. Ltd. Light signals of the searchlight type.

532,263. Westinghouse Brake & Signal Co. Ltd. Electromagnetic relays for railway signalling systems.

532,268. Banyai, M. Means for securing rails to sleepers.

532,269. Silent Channel Co. Ltd. and Beaton, G. H. Guide channels for sliding-doors, windows, and other similar closures.

532,348. Hall & Hall Limited, and Hall, E. J. Packings for stuffing-boxes, pistons, and the like.

532,315. Wikarski, S. Smokeless combustion of fuel in locomotive and like furnaces.

532,354. Butterly Co. Ltd. and Hogg, J. L. Railway wagons and the like.

532,367. Vereinigte Baubeschlag-Fabriken Gretsch & Co. G.m.b.H. Guidance of sliding doors, particularly for vehicles.

532,388. Budd Manufacturing Company, E. G. Rail cars or the like.

532,430. Glenny A. P. Means for the control of apparatus used for the production of high-pressure steam.

532,441. General Railway Signal Company. Time-element electric relays.

532,533. Schneider & Cie. Control devices for steam locomotives.

532,542. Paxman & Co. (Colchester) Ltd., D., and Hazell, R. L. K. Anti-priming apparatus for water-tube steam boilers.

532,564. Hopkinsons Limited and Brown, R. L. Steam hydraulic and like valves.

532,639. Taylor, T. Railway turn-out or switch.

532,681. Schweizerische Lokomotiv- und Maschinenfabrik. Steam locomotives.

532,683. Westinghouse Brake & Signal Co. Ltd. Railway traffic control apparatus.

532,787. Foster Wheeler Limited. Steam generators.

532,855. British Thomson-Houston Co. Ltd. (General Electric Co. Ltd.). Locomotive vehicles.

532,909. Foster Wheeler Limited and Sampson, W. Steam generation and utilisation plants.

532,918. Foster Wheeler Limited. Steam generators.

ALLOY STEEL BOILER RIVETS.—A nickel steel which has been used successfully for the longitudinal seam rivets of locomotive boilers with 2 per cent. nickel steel barrels contains 1·9 per cent. of carbon, 0·15 per cent. (max.) of manganese, 0·30 to 0·50 per cent. of sulphur, 0·045 per cent. (max.) of phosphorus, 0·04 per cent. (max.) of silicon, and 0·15 to 0·30 per cent. of nickel. This material, which has given better results than a 1·25 per cent. nickel steel, gives, for 1-in. bars, a tensile strength of about 65,000 lb. per sq. in., a yield point of 40,000 lb. per sq. in., 28 per cent. elongation on 2 in. in conjunction with a 45 per cent. reduction in area.

OFFICIAL NOTICES

London and North Eastern Railway

NOTICE IS HEREBY GIVEN that, for the purpose of preparing the warrants for Interest on the Company's 3 per cent. and 4 per cent. Debenture Stocks and 4½ per cent. Sinking Fund Debenture Stock for the half-year ending 31st December, 1941, the balances will be struck as at the close of business on 11th December, and Interest will be payable only to those Stockholders whose names are registered on that date.

Transfers of the above-mentioned Stocks should, therefore, be lodged with the Registrar of the Company at Hamilton Buildings, Liverpool Street Station, London, E.C.2, before 5 p.m. on 11th December.

By Order,
P. J. DOWSETT,
Secretary.

Marylebone Station,
London, N.W.1.
1st December, 1941.

Assistant Accountant

REQUIRED for the Sierra Leone Government Railway for two tours of 12 to 24 months, with possible permanency. Salary £400, rising to £720 a year. Free passages and quarters. Candidates must have had at least 7 years experience in the Accountant's Department of a British or Colonial Railway, be experienced in goods and coaching audit work, and be familiar with the preparation of revenue and expenditure accounts and returns and with the preparation and use of Traffic Statistics. Write, stating age and full particulars of qualifications and experience, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/9862.

MANUFACTURING firm specialising in components for railway rolling stock have vacancy on their Sales Staff for a Technical Representative. Applicants should have had an engineering training, preferably with actual railway experience.

Write, giving full particulars of previous experience, age, and salary required, to
Box No. 2411, c/o THE RAILWAY GAZETTE, 33, Tothill Street, London, S.W.1.

Railway and Other Reports

Argentine North Eastern Railway Co. Ltd.—For the year to June 30, 1941, gross receipts were £675,451, against £716,929, and working expenses rose from £507,663 to £569,443, leaving net receipts of £106,008 (£209,266). Exchange losses were reduced from £56,587 to £34,123, and the total income amounted to £73,748. Miscellaneous charges, debenture interest accrued during the year, and interest accrued on arrears of "B" debenture interest totalled £180,276, leaving a debit balance of £106,528. Excessive rainfall was the main cause of the reduction in receipts, and the high cost of fuel, involving an increase of £37,654, was the principal reason for the rise in expenses. The operating ratio was 84·31 per cent. against 70·81 per cent.

Entre Rios Railways Co. Ltd.—Gross receipts for the year ended June 30, 1941, amounted to £989,384 (£1,093,334) and working expenses to £877,889 (£852,551), giving an operating ratio of 88·73 per cent., against 77·98 per cent. Net earnings were £111,495 compared with £240,783, and exchange losses of £34,176 (£65,782) reduce the balance to £77,319. Total net income is £84,485. Miscellaneous charges, debenture stock interest for the year (payment of which is deferred under the scheme of arrangement of June 9, 1941) and interest on arrears of debenture interest total £254,264, leaving a debit balance of £169,779 for the year. The decrease in receipts was due largely to failure of cereal crops caused by weather conditions. High war prices caused the increase in expenses. Coal and oil fuel cost £71,000 more.

Cordoba Central Trust Limited.—The revenue account of the year to June 30, 1941, shows a credit balance of £75,193, out of which an interim payment on the "B" debenture stock of 1½ per cent. was made on June 16, 1941, and it is proposed to make a further distribution of 2½ per cent. on this stock on December 15, leaving a balance of £2,376 to be carried to the credit of undivided revenue. The total distribution on the "B" debenture stock for the year to June 30 last is thus 4 per cent., subject to tax. During the financial year under review £369,246 of first debenture stock was redeemed and cancelled, and a further £84,762 has since been acquired for cancellation.

International Sleeping Car Share Trust Limited.—The loss for the year to May 31, 1941, was £627 (£2,608), the bulk of which arises from income tax of £419 mainly necessitated by the increase in rate. The credit balance forward is £13,303 (£13,900). The directors have been unable to obtain any information since the meeting in October, 1940, as to the Wagon Lits Company, or to the trust's holding of £5,250,000 in that company, which at the time of the French capitulation was believed to be in territory subsequently occupied by the enemy. All action as to the reduction of capital scheme authorised in June, 1940, has been deferred.

R. & J. Dick Limited.—Net profit for the year ended August 31 last, after income tax, E.P.T., depreciation, etc., amounted to £16,479 (£26,402). A sum of £5,000 is again placed to contingencies reserve, and the dividend on the ordinary shares is maintained at 10 per cent., less tax, for the year. The carry forward is £10,493 (£12,251).

Brown, Bayley's Steel Works Limited.—For the year to July 31 last profits were £92,216, against £135,991. Appropriations are made of £20,000 (£50,000) to reserve and of £10,000 (£15,000) for obsolescence of buildings, plant, and machinery. The dividend is 13 per cent., tax free (15 per cent., tax free), and the amount to be carried forward is £40,932 (£42,716).

Contracts & Tenders

It is reported that the Swedish branch of an American motorcar company has begun production of electric vehicles from purely Swedish materials. Both private cars and lorries are to be manufactured on mass production lines. The lorries are expected to have a range of 45 miles and a speed of 20 m.p.h.

U.S. CLASS I RAILROADS EARNINGS.—Class I railroads of the United States in the first eight months of 1941 had an estimated net income, after interest and rentals, of $298,524,000 as compared with $29,350,000 in the corresponding period last year, according to the Bureau of Railway Economics of the Association of American Railroads. The eight-months net railway operating income, before interest and rentals, was $651,089,274, against $369,778,456. Operating revenues in the eight months were $3,403,544,130, compared with $2,744,138,975 in the same period in 1940, and operating expenses amounted to $2,302,227,120, against $2,027,486,510. Class I railroads in the Eastern district in the eight months had a net income, after interest and rentals, of $175,302,976, compared with $75,107,708. In the Southern district the corresponding net income of Class I railroads was $48,670,122, compared with a deficit of $2,388,391 in the first eight months of 1940. Western district Class I railroads had in the eight months a net income of $74,551,252, compared with a deficit of $43,369,173 in the same period of 1940.

British and Irish Railway Stocks and Shares

Stocks	Highest 1940	Lowest 1940	Prices Nov. 28, 1941	Prices Rise/Fall
G.W.R.				
Cons. Ord.	52	22½	41½	– 1
5% Con. Pref.	103½	58	107½	+ 1
5% Red. Pref. (1950)	105½	88	103	—
4% Deb.	107½	90½	112½	—
4½% Deb.	108½	96½	113	—
4½% Deb.	114½	96	118½	—
5% Deb.	124	106	130	—
2½% Deb.	66½	57	68	—
5% Rt. Charge	117½	97	128½	—
5% Cons. Guar.	117	90½	126½	—
L.M.S.R.				
Ord.	24⅞	9	15⅜	– ⅜
4% Pref. (1923)	60½	21⅛	51½	+ 1
4% Pref.	70⅜	35	66⅛	+ 1
5% Red. Pref. (1955)	94⅛	60	93⅛	—
4% Deb.	101⅜	81	104⅛	—
5% Red. Deb. (1952)	109½	102	109½	—
4% Guar.	93⅛	65	98⅛	—
L.N.E.R.				
5% Pref. Ord.	8⅜	1½	3½	+ ⅜
Def. Ord.	4⅜	1½	1½	+ ⅛
4% First Pref.	60	20	50½	—
4% Second Pref.	22⅜	6½	18	—
5% Red. Pref. (1955)	80	34½	77½	—
4% First Guar.	86½	56	88½	– 1
4% Second Guar.	77½	37	78½	– 1
3% Deb.	73½	54½	77½	—
4% Deb.	97⅛	74	103½	—
5% Red. Deb. (1947)	107	96½	103	—
4½% Sinking Fund Red. Deb.	104	98	102½	—
SOUTHERN				
Pref. Ord.	79	34	63½	—
Def. Ord.	22½	7	14	– ½
5% Pref.	104½	58⅜	105½	—
5% Red. Pref. (1964)	105	85	104½	—
5% Guar. Pref.	116½	90	126½	—
5% Red. Guar. Pref. (1957)	114 1/16	94	113½	—
4% Deb.	106½	84½	110½	—
5% Deb.	122½	100	128½	—
4% Red. Deb. (1962-67)	106	96½	107	—
4% Red. Deb. (1970-80)	106⅛	93	107	+ 1
FORTH BRIDGE				
4% Deb.	95½	87	96½	—
4% Guar.	93½	81½	97½	—
L.P.T.B.				
4½% "A"	116	103	117½	—
5% "A"	121½	107	129	—
4½% "T.F.A."	105½	101	101½	—
5% "B"	116	102	116½	—
"C"	65½	24	41	—
MERSEY				
Ord.	26	18½	20½	—
4% Perp. Deb.	92½	84¾	99½	—
3% Perp. Deb.	68	63	72½	—
3% Perp. Pref.	57	50½	56	—
IRELAND				
BELFAST & C.D.				
Ord.	4	3	4	—
G. NORTHERN				
Ord.	4½	1½	14½	+ 1½
G. SOUTHERN				
Ord.	12½	4	14½	+ 1½
Pref.	15½	6	17	—
Guar.	36	15	40	+ 5
Deb.	55½	40	59½	+ ½

XUM

Railway Stock Market

A more cautious attitude has ruled in Stock Exchange markets following the recent strong upward trend in values. Sentiment at the beginning of the week was influenced less by the encouraging war news than by a disposition to await developments in the Far East. Although buying was on a smaller scale, confidence was indicated by the continued absence of any heavy profit-taking, despite the substantial gains recorded in many securities a week ago. British Funds were firm and inclined to make higher prices under the influence of the weight of money awaiting investment, and elsewhere there was steady buying of home railway prior charges, which were well maintained in price. On the other hand, home railway preference and junior issues were less active, despite the attractive yields and the prevailing view that, in the absence of heavy air raids, dividends for 1941 are likely to be at least maintained. In some quarters there is now talk of the possibility of slightly better dividends on some of the junior stocks, although it is realised that this will probably turn on the details of the new War Damage plan, the position as to which is expected to be clarified before long. Nevertheless, based on last year's dividends, yields on L.M.S.R. ordinary, Southern deferred and L.N.E.R. second preference are substantial; generous yields are also shown on L.M.S.R. preference and L.N.E.R. first preference, which can be regarded as virtually assured of their full dividends throughout the war, in the absence of exceptionally heavy air raid damage. Pending clarification of the War Damage scheme, however, it does not appear that home railway stocks will record a strong advance, unless markets generally show sustained improvement. Sentiment is, of course, affected to some extent by the many occasions in the past when the reasonable hopes of stockholders have been disappointed; but it would appear that railway junior stocks are considerably under-valued in relation to other groups of equity securities.

Great Western ordinary stock lost part of its recent improvement, and is 41½ at the time of writing, compared with 42½ a week ago. Similar remarks apply to this company's 5 per cent. preference, which was fractionally lower at 107 but has remained more active. Great Western guaranteed stock was again 127, and the debentures 112½. On balance, L.M.S.R. ordinary went back half-a-point to 16, and the 1923 preference lost a similar amount to 51, although the senior preference kept at 66½. L.M.S.R. guaranteed eased slightly to 98½, and the 4 per cent. debentures were 104⅛. In view of the larger yield, it is being pointed out that L.M.S.R. senior preference would appear to be a more attractive purchase than L.N.E.R. second guaranteed, bearing in mind that there is little difference in the cover for the dividend requirements of these two stocks. L.N.E.R. guaranteed is, of course, cumulative as to dividend, but under existing conditions this can be regarded as mainly of academic importance. L.N.E.R. second and first guaranteed were each a point down on balance, at 78½ and 88½ respectively. On the other hand, this railway's first preference continued in rather better demand, buyers being attracted by the large yield, and at 51 the price was the same as a week ago. Moreover, L.N.E.R. second preference at 18 was little changed on balance. Elsewhere, Southern preferred showed a small reaction following last week's good improvement, having eased from 64 to 63 at the time of writing, while the deferred was 14, compared with 14¾ a week ago. On the other hand, demand was again in evidence for Southern 5 per cent. preference, which held its rise to 105½. London Transport "C" at 41½ was also unchanged on balance.

Business in foreign railway securities was again on a smaller scale, and lower prices ruled in most directions, although no appreciable selling was reported. Entre Rios 4 per cent. debentures were quoted at 50, and were firmly held on the prospect of more regular payments on account of interest arrears. At the time of writing Canadian Pacific have reflected the easier trend of markets.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1940-41	Week Ending	Traffic for Week: Total this year	Traffic for Week: Inc. or Dec. compared with 1940	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1940	Prices: Lowest 1940	Prices: Nov. 28, 1941	Prices: Yield % (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	23.11.41	23,200	+ 1,670	47	915,650	800,850	+ 114,800	Ord. Stk.	11¼	3½	10	Nil
	Argentine North Eastern	753	22.11.41	ps. 164,900	+ ps.25,200	21	ps. 4,106,600	ps. 3,532,300	+ ps. 574,300	,,	3½	1	3	Nil
	Bolivar	174	Oct., 1941	3,650	+ 470	43	38,504	39,150	− 646	6 p.c. Deb.	6½	5	7	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds	8	5	7½	Nil
	Buenos Ayres & Pacific	2,801	15.11.41	ps.1,350,000	+ ps.177,000	20	ps.25,670,000	ps. 22,382,000	+ ps.3,288,000	Ord. Stk.	4½	1	7	Nil
	Buenos Ayres Great Southern	5,082	15.11.41	ps.2,095,000	+ ps.77,000	20	ps.42,080,000	ps.37,591,000	+ ps.4,489,000	Ord. Stk.	10⅜	3	9½	Nil
	Buenos Ayres Western	1,930	15.11.41	ps. 842,000	+ ps.79,000	20	ps.16,440,000	ps.12,823,000	+ ps.3,617,000	,,	8⅜	2	7½	Nil
	Central Argentine	3,700	22.11.41	ps. 1,603,000	+ ps.194,650	21	ps.38,036,900	ps. 29,105,900	+ ps.8,931,000	,,	8¾	2	7½	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	4	½	2½	Nil
	Cent. Uruguay of M. Video	972	15.11.41	23,537	+ 231	20	445,899	389,847	+ 56,052	Ord. Stk.	3¾	½	8½	Nil
	Costa Rica	188	Oct., 1941	22,162	+ 6,647	18	91,158	72,735	+ 18,423	Stk.	23⅛	14	12	16½
	Dorada	70	Oct., 1941	10,220	− 1,480	43	122,970	122,400	+ 570	1 Mt. Db.	99	97½	97	6⅛
	Entre Rios	808	22.11.41	ps.235,900	+ ps.28,600	21	ps. 5,985,000	ps. 4,857,700	+ ps.1,127,300	Ord. Stk.	4	½	6½	Nil
	Great Western of Brazil	1,016	22.11.41	15,500	+ 800	47	461,400	485,400	− 24,000	Ord. Sh.	4/-	1/-	⅛	Nil
	International of Cl. Amer.	794	Sept., 1941	$367,431	+ $41,642	39	$4,257,101	$4,405,419	− $148,318	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	9d.	9d.	½	Nil
	La Guaira & Caracas	22¾	Oct.,1941	7,445	+ 650	43	65,445	67,095	− 1,650	—	6	4	—	—
	Leopoldina	1,918	22.11.41	26,727	+ 3,202	47	1,239,080	1,083,282	+ 155,798	Ord. Stk.	2⅛	¼	4	Nil
	Mexican	483	21.11.41	ps. 260,900	+ ps.53,800	20	ps. 6,143,100	ps. 5,428,200	+ ps.714,900	,,	2/11½	⅛	½	Nil
	Midland of Uruguay	319	Sept., 1941	13,499	+ 1,530	13	40,979	33,560	+ 7,419	—	—	—	—	—
	Nitrate	386	15.11.41	5,952	− 2,274	45	128,796	154,899	− 26,103	Ord Sh.	2¾	1	3½	3⅛
	Paraguay Central	274	15.11.41	$3,411,000	+ $500,000	20	$66 948,000	$68 351,000	− $1,403,000	Pr. Lt. Stk.	41	36	42¼	7⅛
	Peruvian Corporation	1,059	Oct.,1941	73,593	+ 6,715	17	292,346	265,325	+ 27,021	Pref.	4	1	6	Nil
	Salvador	100	Sept , 1941	c45,000	+ c5,000	13	c156,172	c 126,683	+ c29,489	—	—	—	—	—
	San Paulo	153½	16.11.41	31,875	− 1,749	46	1,690,875	1,666,745	+ 24,130	Ord. Stk.	50	23	47½	4⅞
	Taltal	160	Oct.,1941	5,600	+ 3,005	17	21,990	9,320	+ 12,670	Ord. Sh.	15/1½	⅜	1	Nil
	United of Havana	1,346	22.11.41	18,656	+ 5,145	21	396,108	316,663	+ 79,445	Ord. Stk.	⅜	½	2	Nil
	Uruguay Northern	73	Sept., 1941	1,219	+ 208	13	3,910	2,937	+ 973	—	—	—	—	—
Canada	Canadian National	23,560	21.11.41	1,241,523	+ 218,592	46	53,685,644	43,320,704	+ 10,364,940	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	—	Perp. Dbs.	86	68	94½	4½
	Grand Trunk	—	—	—	—	—	—	—	—	4 p c. Gr.	105½	95½	101¼	3½
	Canadian Pacific	17,146	21.11.41	968,600	+ 272,400	46	38,879,000	29,882,800	+ 8,996,200	Ord. Stk.	9⅞	4⅜	12½	Nil
India†	Assam Bengal	1,329	—	—	—		—	—	—	Ord. Stk.	99⅜	71	100	3
	Barsi Light	202	20.9.41	3,232	− 450	24	83,887	71,160	+ 12,727	—	—	—	—	—
	Bengal & North Western	2 099	Oct.,1941	245,100	− 634	4	245,100	245,734	− 634	Ord. Stk.	283	234	335	4½
	Bengal-Nagpur	3,269	10.7.41	222,300	+ 27,943	14	2,552,246	2,417.662	+ 134,584	,,	96	83⅜	100½	4
	Bombay, Baroda & Cl. India	2,986	20.11.41	312,150	+ 14,700	32	6,698,325	6,200,550	+ 497,775	,,	108	99	107½	5⅞
	Madras & Southern Mahratta	2,939	10 9.41	193,425	+ 50,040	23	3,278,286	2,691,099	+ 587,187	,,	104	97⅞	102½	7⅛
	Rohilkund & Kumaon	546	Oct., 1941	48,150	+ 1,105	4	48,150	47.045	+ 1,105	,,	284	238	335	4½
	South Indian	2,500	10.8.41	136,398	+ 13,893	19	1,860,584	1,640,073	+ 220,511	,,	93¾	83	97½	4⅛
Various	Beira	204	Aug., 1941	78,248	—	48	805,794	—	—	—	—	—	—	—
	Egyptian Delta	610	31.7.41	7,912	+ 2,864	18	82,025	56,624	+ 25,401	Prf. Sh.	7/10½	⅜	2	N
	Manila	—	—	—	—	—	—	—	—	B. Deb.	53	44½	64	5½
	Midland of W. Australia	277	May, 1941	17,591	+ 3.683	48	167.924	145,304	+ 22.620	Inc. Deb.	88	80	89½	6⅞
	Nigerian	1,900	30.8.41	38,550	+ 10,823	22	1,122,822	783.893	+ 338,929	—	—	—	—	—
	Rhodesia	2,442	Aug., 1941	469.745	—	48	5,152,(45	—	—	—	—	—	—	—
	South Africa	13,291	27.9.41	788,722	+ 63,377	26	19,364.720	17,463,590	+ 1,901,130	—	—	—	—	—
	Victoria	4,774	July, 1941	955,039	+ 86,611	4	955,039	868,428	+ 86,611	—	—	—	—	—

Note. Yields are based on the approximate current prices and are within a fraction of ⅛ Argentine traffics are given in pesos
† Receipts are calculated @ 1s. 6d. to the rupee

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